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Sustainable Land Use Planning in Ontario: Protecting Against Aggregate Extraction Operations

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Abstract

Ontario Land Use Planners who assist the Aggregate Extraction Industry often fail to recognize that aggregate extraction is among the most *noxious*, *toxic* and *destructive* land uses, and a major source of land use conflict. These operations frequently leave little or no possibility for rehabilitation to an economically viable state, particularly since the Aggregate Resources Act (ARA) does not prohibit extraction below the water table. An ill-defined and inadequate body of land use planning knowledge among Members of the Ontario Professional Planners Institute (OPPI) perpetuates an information gap regarding the severe environmental and community impacts of aggregate extraction, undermining prospects for a resilient and sustainable quality of life for present and future generations. Failure to be aware of and fully comprehend all the potential *adverse effects* of aggregate extraction operations hinders a land use planner's ability to identify sensitive land uses and activities, leaving the environment and community vulnerable to impacts such as habitat loss, water contamination, toxic fumes, dust and noise, flyrock debris, visual impairment and depreciated property values. Health, safety and well-being are often overshadowed by the self-serving financial interests of private for-profit legal entities, representing a critical failure of effective land use planning. While aggregate resources (sand, gravel and crushed stone) are essential for building and road construction, their extraction in inappropriate locations can have significant negative impacts on the environment and communities. These deleterious impacts from a land use perspective must be identified, disclosed and understood before they can be effectively addressed to ensure permanent land use compatibility.

Keywords

Land use compatibility; Land use planning; Zoning; Aggregate extraction operations; Adverse effects; Planner competence

Introduction

This paper offers a comprehensive view of aggregate extraction operations addressing land use compatibility in a context-specific framework that accounts for the anticipated magnitude and duration of operations. Additionally, it documents the probable impacts of aggregate extraction both onsite and offsite, and examines how these impacts align with the list of *adverse effects* defined in the Provincial Planning Statement (2024) report. The analysis concludes with several effective measures to address land use compatibility, protect the health, safety and welfare of the community, and eliminate, avoid or reduce all adverse effects from proposed aggregate extraction operations to a "trivial" level, while containing all potential negative externalities onsite. The ultimate objective of restricting the locations of particularly noxious uses or activities is to effect the permanent separation of incompatible uses at the parcel (site) level (Shertzer, Twinam and Walsh, 2022).

Here, land use compatibility refers to the degree to which different land uses can exist harmoniously without creating conflicts or *adverse effects*. It involves assessing and planning for the interaction between various types of land use, such as residential, commercial, industrial and recreational, to ensure they do not negatively impact each other. A land use matrix is a template tool used in urban planning and land use management to categorize different land uses within a specific area. It helps planners and decision-makers understand how land is utilized and identify potential conflicts or compatibilities between different land uses.

Zoning by-laws or ordinances operate prospectively and are enacted with "[t]he ultimate purpose of zoning…to reduce all non-conforming uses within the zone to conformity as speedily as is consistent with proper safeguards for the interests of those affected, and that, given this purpose,…a strict policy against extension or expansion of those uses is warranted."[1] This approach to zoning is particularly relevant when considering the impacts of aggregate extraction operations, as it helps to ensure that these activities are confined to appropriate areas and do not negatively affect existing and future surrounding land uses and property values (Wenter, 2019). Zoning by-laws or ordinances are to guide and regulate land use in a way that aligns with the municipality's long-term planning goals and visions of its Official Plan, and to support permanent land use compatibility. According to *Canadian Law of Planning and Zoning* (Rogers and Butler, 1973), "the principal purpose of zoning regulations, as with restrictive covenants, is to preserve property values by prohibiting uses which are believed to be deleterious to neighbourhoods, mainly residential in character", and "[l]and values are thus preserved by keeping out undesirable uses…(para 113)."[2]

Zoning, in general, is intended to protect the public health, safety and welfare by separating incompatible uses.[3] "Legislation enacted for the promotion of public health,

[1] *Hansen Brothers Enterprises, Inc., v. Board of Supervisors of Nevada County et al.,* 12 Cal.eth 533 (1996) 907 P.2d 1324. https://law.justia.com/cases/california/supreme-court/4th/12/533.html.

[2] *Service Corporation International (Canada) Inc. v. Burnaby (City of)*, 1999 CanLII 7012 (BC SC), <https://canlii.ca/t/1d45r>, retrieved on 2025-01-14.

[3] *Village of Belle Terre v. Boraas*¸416 U.S. 1, 9 (1974). https://supreme.justia.com/cases/federal/us/416/1/.

safety, and general welfare is entitled to 'liberal construction 'with a view towards the accomplishment of its highly beneficent objectives.'"[4] [Sutherland, Statutory Construction, §,71.01 (4th Ed., 1974)]. The sections that follow provide a comprehensive overview of the potential adverse effects of aggregate extraction on the environment and its inhabitants, human and non-human, from a land use perspective. Knowledge gaps apparent in existing land use planning are identified and discussed to facilitate effective land use policies and decisions founded upon consistent and relevant criteria. A recommended checklist of steps to be undertaken by municipalities in the review process of an application to permit an aggregate extraction operation is also provided.

Aggregate Extraction Operations: A Noxious, Toxic and Destructive Land Use

Aggregate extraction operations are regarded as one of the most noxious, toxic and destructive land uses due to their significant environmental and social impacts. These operations are generally incompatible with most legally permitted land uses, with many jurisdictions prohibiting industrial activities like aggregate extraction near residential (including home occupations and businesses), commercial, institutional and environmentally sensitive areas. The various noxious, toxic and destructive impacts of aggregate extraction operations are listed as follows:

Noxious Impacts:

- *Noise and Vibration:* Continuous noise and vibrations from blasting, machinery (e.g., crushers, conveyors, drilling rigs and loaders), equipment (e.g., compressors and water pumps) and dump trucks disrupt daily life and can cause physical and mental stress to nearby residents.
- *Odour:* Emissions from machinery, equipment and chemicals used in extraction processes can produce objectionable odours, affecting the quality of life for those living, working or playing nearby.
- *Dust and Particulate Matter:* High levels of dust generated during extraction and processing and transportation of aggregate can create health hazards and lower air quality, making the environment less habitable.
- *Flyrock Debris:* During blasting operations, flyrock can be ejected a considerable distance into the air, creating significant public safety hazards and causing property damage onsite and offsite.

Toxic Impacts:

- *Air Pollution:* Emissions of toxic gases such as nitrous oxide (N_2O), carbon monoxide (CO), and hydrogen sulfide (H_2S) can cause respiratory issues and other health problems.
- *Water Contamination:* Runoff-carrying pollutants like heavy metals and chemicals can contaminate water sources, affecting both human populations and aquatic life.
- *Crystalline Silica:* Dust containing crystalline silica is a known carcinogen and poses serious health risks to workers and nearby residents.

[4] *State ex rel. Florence-Carlton Sch. Dist. v.Comm'rs of Ravalli Cty.,* 180 Mont. 285, 291, 590 P.2d 602, 605 (1978). https://casetext.com/case/state-ex-rel-sch-dist-15-16-v-brd-cty-comm.

Destructive Impacts:

- *Habitat Destruction:* Clearing land for aggregate extraction operations removes natural habitats, leading to loss of biodiversity and disruption of ecosystems. Land fragmentation caused by these operations, which can effectively continue indefinitely in Ontario, Canada, further exacerbates the problem by breaking up large, contiguous habitats into smaller, isolated patches. This fragmentation can:
  - Reduce Genetic Diversity: Isolated populations of plants and animals may experience inbreeding and a decrease in genetic diversity, making them more vulnerable to diseases and environmental changes.
  - Disrupt Animal Movement: Fragmented habitats can impede the movement of wildlife, affecting their ability to find food, mates and shelter.
  - Increase Edge Effects: Fragmented landscapes have more "edges" where different ecosystems meet, which can alter environmental conditions and expose wildlife to increased predation and competition.
  - Alter Microclimates: Changes in the landscape can create microclimates with different temperature, humidity and light conditions, impacting plant and animal species differently.
  - Impact Ecosystem Services: Fragmentation can affect ecosystem services such as pollination, water purification and carbon storage, disrupting the balance of natural processes.
- *Soil Degradation:* The removal of topsoil and subsoil can lead to erosion and loss of fertile land, making it difficult for vegetation to regrow. Additionally, vibrations can cause soil compaction, affecting soil structure and fertility.
- *Land Subsidence:* The removal of large volumes of groundwater can cause the ground to sink, damaging foundations and infrastructure. Vibrations, particularly from activities like blasting, can exacerbate subsidence issues, leading to structural damage and ground instability.
- *Water Table Impact:* Continuous groundwater pumping and extraction can lower water tables, dry up wells, and cause long-term damage to the hydrological balance, robbing local communities of their legal rights to uninterrupted access to groundwater for drinking, irrigation and other purposes. These activities can result in increased costs for water supply, as communities may need to invest in exorbitant alternative water sources or infrastructure to maintain sufficient water supply.

> "Since aggregate deposits act as underground water reservoirs, once the aggregate is gone, the water storage capacity is lost as well. In some cases a large portion of a stream's volume [or river's volume, e.g., Credit River][5] is derived from groundwater, which maintains a 'base flow' for

[5] A significant portion of the water in the Credit River comes from groundwater sources. The headwaters of the river are fed by the groundwater from the Niagara Escarpment, near Orangeville and Caledon East. This groundwater helps maintain the river's flow, especially during dry periods. As the river flows downstream, additional groundwater seepage from surrounding areas contributes to its flow. The Credit River travels through tributaries before emptying into Lake Ontario at Port Credit, Mississauga, covering a distance of 90 kilometres (56 miles). Surface runoff, tributaries, wetlands and lakes also contribute water to the Credit River. The Credit River watershed spans a large area, including parts of the Niagara Escarpment, Oak Ridges Moraine, and Greenbelt, which all play a role in providing water to the river. According to a 2009 study by the Pembina Institute, the Credit River Watershed provides a minimum of $371 million in ecological services to area residents. Additionally,

> streams. Base flow is important, as it often ensures that stream flow is maintained, even in the very dry summer season. Hence, land disturbance from pit and quarry activity affect flow, even if the excavation doesn't extend below the water table (Environmental Commissioner of Ontario, 2003, p. 30)."

- *Visual Impact:* The alteration of landscapes by large aggregate extraction operations can have long-lasting visual scars, reducing the aesthetic and economic value of the surrounding area, and berms around aggregate extraction operations block views.
- *Cultural Heritage Loss:* Aggregate extraction operations can lead to the destruction of sacred sites, burial grounds, and archaeological sites, particularly those significant to First Nations. This loss of cultural heritage can have profound impacts on the cultural identity and traditions of Indigenous communities, erasing important historical records and severing ties to ancestral lands.
- *Flyrock Debris:* Flyrock can cause physical damage to structures, vehicles, machinery, equipment and infrastructure. The sudden and unpredictable nature of flyrock can lead to costly repairs and maintenance, and potential injuries, permanent disabilities or fatalities, which disrupt the community and environmental stability. Vibrations can similarly cause structural damage to buildings, infrastructure and other physical assets.
- *Climate Impact:* The extraction and transportation processes contribute to greenhouse gas emissions, impacting the global climate. The overall carbon footprint of aggregate extraction operations is significant due to the energy-intensive nature of the processes involved.

Aggregate extraction operations can also be classified as a "Noxious Use" due to their potential to create significant nuisances such as noise, vibrations, flyrock debris, fugitive dust, toxic fumes, and other emissions. These operations can disrupt the environment and quality of life for nearby residents, leading to health and safety concerns, and interfering with the use and enjoyment of public and private third-party properties. Due to these impacts, many jurisdictions with strict zoning regulations do not permit such activities near sensitive land uses like residential areas, schools, libraries, healthcare facilities, daycare centres, places of worship, parks, rural retreats or other areas of significant activity. This helps to mitigate the adverse effects and protect public safety, health and well-being. For example, the Town of Caledon Zoning By-law prohibits "Noxious Uses", which are defined as follows:

> *"Noxious Use means a use which, from its nature or operation, creates a nuisance or is liable to become a nuisance or offensive by the creation of noise or vibration, or by reason of the emission of gas, fumes, dust or objectionable odour, or by reason of the matter, waste or other material generated by the use, and shall include any uses which may be declared to*

the natural capital of the watershed saves taxpayers $100 million annually in water costs that would otherwise be incurred if water had to be pumped from Lake Ontario. The watershed is home to approximately 750,000 people. Adjusted for inflation, the $371 million in ecological benefits is worth approximately $480 million ($371 x $[1 + 0.02]^{16}$) in 2025, and the $100 million savings in 2009 is worth approximately $137 million in 2025.

> *be a noxious or offensive trade or business under the Public Health and Promotion Act, as amended" (3-27, Revised: June 13, 2023)*
> Prohibited Uses, Town of Caledon Zoning By-law Section 4.32, revised July 20, 2023:
> 4.32.1 No *person* shall, within the Zoned Area, use any land or *construct, alter* or use any *building* or *structure* for…- a *noxious use.*

The zoning dictionary defines *Noxious* as follows:

> *"When used with reference to any use or activity in respect of any land, building or structure or a use or activity which, from its nature or from the manner of carrying on same, creates or is liable to create, by reason or destructive gas or fumes, dust, objectionable odor, noise or vibration or unsightly conditions" (ZoningTrilogy.com. ©2025).*[6]

Aggregate extraction can also be a *nuisance.* In *St. Lawrence Cement v. Barrette*, [2008], 3 S.C.R. 392, under Common Law,[7] the Supreme Court of Canada, at para. 77, describes *Nuisance* as follows:

> *"At common law, nuisance is a field of liability that focuses on the harm suffered rather than on prohibited conduct. Nuisance is defined as unreasonable interference with the use of land. Whether the interference results from intentional, negligent or non-faulty conduct is of no consequence provided the harm can be characterized as a nuisance. The interference must be intolerable to an ordinary person. This is assessed by considering factors such as the nature, severity and duration of the interference, the character of the neighbourhood, the sensitivity of the plaintiff's use and the utility of the activity. The interference must be substantial, which means that compensation will not be awarded for trivial annoyances."*[8]

Given that a license to operate a Pit or Quarry in Ontario has no expiry date and no restriction on the depth of extraction, the impacts from aggregate extraction operations are effectively permanent. This permanency is a crucial factor in demonstrating that the interference with the use and enjoyment of third-party property is unreasonable and non-trivial.[9] The following assessment factors support the conclusion that such operations can constitute a nuisance under common law:

- *Nature of the Interference:* The type of disruption (e.g., noise, dust, toxic fumes, vibrations, flyrock debris) and its impact on the claimant.

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6 Noxious • ZoningTrilogy.com

7 "The common law is law that is not written down in legislation. Common law evolved into a system of rules based on precedent. This is a rule that guides judges in making later decisions in similar cases. The common law cannot be found in any code or body of legislation, but only in past decisions. At the same time, it is flexible. It adapts to changing circumstances because judges can announce new legal doctrines or change old ones," p. 4, Canada's System of Justice, *Department of Justice Canada*, ©Her Majesty the Queen in Right of Canada, 2015, Canada's System of Justice.

8 "Nuisance consists of an interference with the claimant's occupation or enjoyment of land that is both substantial and unreasonable. A substantial interference is one that is non-trivial, amounting to more than a slight annoyance or trifling interference," *Antrim Truck Centre Ltd. v. Ontario (Transportation)*, 2013 SCC 13 (CanLII), [2013] 1 SCR 594, <https://canlii.ca/t/fwdn1>, retrieved on 2024-07-19.

9 *Delavalle v. Acciavatti*, 2024 ONSC 5137 (CanLII), <https://canlii.ca/t/k6vw9>, retrieved on 2024-12-28.

- *Severity and Duration:* How intense and long-lasting the interference is.
- *Character of the Neighbourhood:* The typical land use in the area (residential, commercial, industrial) and how the interference compares to the norm.
- *Sensitivity of the Claimant's Use:* Whether the claimant's use of their land is unusually sensitive or within reasonable expectations.
- *Utility of the Activity:* The broader societal benefits of the defendant's activity versus the harm caused to the claimant.

A Planners Dictionary [©April 2004], American Planning Association (2015),[10] defines *Nuisance* as follows:

- *Any thing, condition, or conduct that endangers health and safety, or unreasonably offends the senses, or obstructs the free use and comfortable enjoyment of property, or essentially interferes with the comfortable enjoyment of life (Wood River, Ill.)*
- *Activity or use that is annoying, unpleasant, or obnoxious. (Sandy, Ore.)*
- *Anything offensive or obnoxious to the health and welfare of the inhabitants of the city; or any act or thing repugnant to, or creating a hazard to, or having a detrimental effect on the property of another person or to the community. (Charleston, Ill.)*
- *An offensive, annoying, unpleasant, or obnoxious thing, act, or practice, a cause or source of annoyance, especially a continual or repeated invasion of a use or activity which invades the property line of another so as to cause harm or discomfort to the owner or resident of that property. Excessive or noisy vehicular traffic, dust, glare, and smoke are examples of nuisances. (Trenton Township, Ohio)*
- *Any public nuisance known at common law or in equity jurisprudence.*
- *An interference with the enjoyment and use of property. (Siskiyou County, Calif.)*

Closing Premises for Public Nuisance:

Section 447.1 of the Ontario Municipal Act, 2001, S.O. 2001, c. 25,[11] allows for the closure of premises that cause a public nuisance. A municipality can request the Superior Court of Justice to order the closure of all or part of a building or area within the municipality for up to two years if the court determines, based on a balance of probabilities, that:

1. Activities or conditions on the property create a public nuisance or contribute to a public nuisance in the surrounding area.
2. This public nuisance negatively affects the use and enjoyment of nearby properties in various ways, such as:
    - Trespassing on other properties.
    - Blocking or interfering with roads and public spaces.
    - Increasing garbage, noise, or traffic, or causing unusual traffic patterns.
    - Activities that significantly lower property values.
    - Increasing harassment or intimidation.

[10] The Dictionary cautions, "Adoption of another jurisdiction's standards, without consideration of local socioeconomic standards, comprehensive plan, political environment, the input of the citizens for the community, and legal review according to state enabling legislation, among other issues, may result in standards that just don't fit [p. 2]."

[11] https://www.ontario.ca/laws/statute/01m25/v102.

- Presence of graffiti.

3. The owner or occupants knew or should have known about the nuisance but did not take enough action to stop it.

In *Newmarket (Town) v. Halton Recycling Ltd.*, (2006),[12] the Superior Court of Justice, under Section 433 of the Municipal Act, 2001, made a landmark ruling. A Newmarket, Ontario, composting company whose odours had distressed workers and residents for two years, was ordered to shut down its operations if it failed to carry out its proposed plan to eliminate off-site smells within 90 days. Over a two-year period from July 2004 onward, the Town of Newmarket recorded 1,069 odour complaints about Halton Recycling, within a 1,800-metre zone, with 80 percent of the complaints coming from residents within a 1,200-metre radius. "Local residents described the odours as bad, putrid, pungent, sickening, horrendous, foul, obnoxious, and smelling like feces." "The complainants' evidence was that the odours caused gagging, penetrated their homes spoiling meals and social events, and their use and enjoyment of the homes."

- "The losses of comfort and convenience were neither trivial nor transitory and affected a number of persons in the vicinity of Halton's emissions."
- "[T]hey affected the physical wellbeing of some of the residents and individuals who work in the area and caused stress to the adjacent neighbourhood and workplace alike."
- "The emissions emanating from the Halton processes cause an unreasonable interference with the use and enjoyment of property and in the individuals who live and work in the concentric sphere… around the Halton facility"

Judge Bryant relied on the 2005 Ontario Court of Appeal decision in *Croplife Canada v. Toronto (City)* and found that Section 433 "should not be restrictively interpreted to limit relief to the enumerated categories of public nuisances." He also affirmed the clear statement in *Spraytech v. Hudson (Town)*, 2 S.C.R. 241, that "the mere existence of provincial (or federal) legislation in a given field does not oust municipal prerogatives to regulate the subject matter."

> "The decision confirms that local environmental issues and the regulation of environmental public nuisances is within the purview of municipalities to regulate and that the municipality can regulate when the Ministry of the Environment (MOE) has not taken steps to facilitate mitigation of the public nuisance impact on the community."

In *Crushed Stone Co., Inc. [C.S.C], et al. v. Moore, et al.*, (1962),[13] the Supreme Court of Oklahoma, in a unanimous decision, upheld the lower court's ruling that declared a limestone quarry to be both a *public* and *private nuisance*, and that ordered C.S.C. to cease quarry operations permanently. In October 1958, nearby owners and inhabitants of premises on rural acreage of 5 to 40 acres alleged that the operations of the quarry interfered with "their rights to the quiet and peaceful occupation and enjoyment…" The complaints against C.S.C.'s operation, testified to at trial by four men, together with their wives, and a widow, were directed,

[12] Company ordered to clean up the smell. Law Times, November 20, 2006. https://www.lawtimesnews.com/news/general/company-ordered-to-clean-up-the-smell/258994.

[13] *Crushed Stone Co., Inc., et al. v. Moore, et al.*, 269 P.2d 811 (1962). https://www.courtlistener.com/opinion/1162338/crushed-stone-co-v-moore/

- *[to] the dust, which filled the air and settled on nearby property;*
- *to the noise, concussion, vibration and rock propulsion [flyrock debris] caused by C.S.C's*
  setting off explosives to blast rock out of the ground; and
- *to the noise and dust caused by the subsequent crushing of the rock into "agricultural*
  limestone" and its loading into dump trucks to be hauled away.
  - *Some of…[the] witnesses testified that the air around their homes was so full of dust, after such blasting, that it was hard to breathe.*
  - *Some testified that the dust not only covered the vegetation on their properties, making it look white, but came into their houses—even with the doors closed—coating the furniture and floors and soiling draperies and damaging painted surfaces.*
  - *Some also testified that the explosions shook the earth as well as their houses, cracking and dislodging the masonry and sheetrock therein and frightening and/or disturbing the occupants.*
  - *Some also testified that the explosions propelled flying rocks [flyrock debris] onto the premises, breaking limbs from trees and creating a condition hazardous to both animal and human life.*
  - *Some of the witnesses also testified that, because of the dust, they could not have the windows and doors of their homes open, and could not hang clothes out in their yards to dry.*
  - *One witness testified that the dust aggravated his allergies, and worsened his wife's nervous condition.*
  - *More than one witness testified that the noise from the work at the quarry disturbed, or interrupted, their sleep.*

While the property owners were awarded monetary damages, the financial compensation did not adequately address the harm caused by the operation of the quarry. The nuisances experienced were a "substantially and irremediable injury" justifying an injunction against C.S.C. to cease quarry operations. In *Bozza v Thorold*, 2014,[14] a decision of the Ontario Superior Court of Justice, *"it is stated, [92] Claims in nuisance or under the doctrine in Rylands v Fletcher are by and large easier to prove than a claim in negligence.*

> [90] In *Bower v Richard[son] Construction Co. Ltd.*, 1938 CanLII 111 (ON CA), the Court of Appeal upheld a judgment against the defendant for damage to a building caused by vibrations due to the use of a pile driver in the course of construction of a bridge. Liability was found on the basis of *Rylands v Flether*. Fisher JA observed:
>
> > "During the argument I was in some doubt as to whether the principle, enunciated in Rylands v Fletcher (1868), L.R. 3 H.L. 330, applied. I am now of opinion that the person who starts and causes vibrations to escape is in much the same position as a person who brings water on to his own premises and allows it to escape." The core principle from *Rylands v Fletcher* states a person who makes a non-natural use of land, bringing

[14] *Bozza v Corporation of the City of Thorold*, 2014 CanLII 7438 (ON SCSM), <https://canlii.ca/t/g4g41>, retrieved on 2025-01-13.

> thereon and keeping anything likely to do mischief if it escapes, is prima facie liable for the natural consequences of its escape.
>
> [91] *Bower* would be cited in *Barrette et al. v Franki Compressed Pile Company of Canada, Limited*, 1954 CanLII 110 (ON SC), a decision of Schroeder J. *Barrette* involved pile driving operations which caused property damage. Schroeder J had some reservations if such a claim fitted into the *Rylands v Fletcher* principle but readily concluded the conduct of the defendant amounted to a nuisance.

Without a defined end date and in an incompatible geographic location, aggregate extraction operations in Ontario cause ongoing and substantial interference with the use and enjoyment of third-party private and public property, rendering it impossible to classify aggregate extraction as an "interim" use. The same is true of the 1,524 "zombie" Pits and Quarries, dormant for more than 10 years, as they effectively preclude or hinder the development, expansion of existing development or redevelopment of surrounding lands with legally permitted uses rendered sensitive and incompatible with aggregate extraction operations (Sevelka, 2023).

Aggregate Extraction Operations Produce Contaminants with Potentially Deadly Consequences

According to the Ontario Environmental Protection Act (EPA), as amended, the pollutants produced by aggregate extraction operations meet the definition of a *Contaminant*. These contaminants can cause or have the potential to cause an *adverse effect*, individually or collectively. This is particularly concerning in Ontario, where a license to permit aggregate extraction has no expiry date.

> *"contaminant" means any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that cause or may cause an adverse effect; ("contaminant")*[15]

The main *contaminants* produced by aggregate extraction operations are listed as follows:

1. *Dust and Particulate Matter:* Dust, generated from blasting, crushing and transporting materials, can contain fine particulate matter (PM10 and PM2.5) can be inhaled. Chronic exposure over the years can lead to serious respiratory issues.
2. *Crystalline Silica:* Commonly found in sand and gravel, crystalline silica dust is a known carcinogen. There are no "safe" levels of exposure to crystalline silica, as even low levels pose health risks over time.[16] The World Health Organization (WHO) recommended in 2021 that exposure to PM2.5 should not exceed 5 micrograms per cubic metre (5µg/m³), averaged over a year, half the limit previously recommended in 2005.[17]

[15] RSO 1990, c E.19 | Environmental Protection Act | CanLII.
[16] Silicosis. (2024, March 25). Canadian Centre for Occupational Health and Safety. CCOHS: Silicosis.
[17] WHO Global Air Quality Guidelines, *World Health Organization*, September 22, 2021. WHO Global Air Quality Guidelines.

3. *Nitrous Oxide (N_2O):* A potent greenhouse gas produced during blasting operations, with a global warming potential about 298 times that of carbon dioxide (CO_2) over 100 years, and a significant contributor to climate change. Exposure to high concentrations of N_2O can cause health issues such as dizziness, headaches, and asphyxiation.
4. *Hydrogen Sulfide (H_2S):* A toxic odourless and colourless gas with short-term exposure causing eye irritation, nausea, dizziness, and breathing difficulties, and in high concentrations can lead to rapid unconsciousness and even death. Small exposure over time can lead to chronic respiratory issues, cardiovascular problems and neurological disorders. Prolonged exposure can damage the nervous system, potentially causing memory loss and difficulty concentrating.[18]
5. *Carbon Monoxide (CO):* A toxic odourless and colourless gas that can be very dangerous because it interferes with the body's ability to carry oxygen in the blood. Prolonged exposure can lead to serious health issues, including headaches, dizziness, confusion and even death in high concentrations.[19]
6. *Flyrock:* Chunks of rock launched into the air during blasting (detonation of explosives), which can cause physical damage, injury, permanent disability, or death. (Flyrock ruled a contaminant in Castonguay Blasting Ltd. v. Ontario (Environment), 2013, SCC 52)[20]
7. *Noise Pollution:* Blasting, machinery operations and trucks hauling aggregate generate significant noise, affecting both human and wildlife habitats.
8. *Water Contamination*: Disruption of natural water recharge can lead to reduced water quality, affecting both surface and groundwater.
9. *Vibrations*: From blasting, machinery and trucks, which can cause structural damage to buildings, disrupt wildlife habitats, and cause discomfort or health issues for nearby residents.

Aggregate Extraction – A Major Source of Adverse Effects (Nuisance and Trespass)

A landowner is not entitled to an unfettered right to use their land for any purpose or enterprise that causes a nuisance to neighbours. The entirety of nuisance law rests upon the common law maxim: "Sic utere tuo alienum non laedas — *every man must so use his own property as not to interfere with that of his neighbour*." This principle underpins the law of nuisance, emphasizing that property owners must consider the impact of their actions on neighbouring properties. Even a lawful activity can be a nuisance "depending on the particular location of the activity and the way it is managed or operated."[21]

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[18] (2024, October 19). *The Dangers of H@S Exposure: Understanding the Short- and Long-term Health Effects.* Allstar Enviro Safety. The Dangers of H2S Exposure: Understanding the Short- and Long-Term Health Effects – H2S Alive ESC | Classroom Safety | Online Courses.

[19] (2007, May) Carbon Monoxide and Mining. U.S. Department of Labor Mine Safety and Health Administration. Carbon Monoxide and Mining.

[20] *Castonguay Blasting Ltd. v. Ontario (Environment)*, 2013 SCC 52 (CanLII), [2013] 3 SCR 323, <https://canlii.ca/t/g1038>, retrieved on 2024-12-03.

[21] *Parker v. Ashford*, 661 So. 2d 213, 218 (Ala. 1995). https://law.justia.com/cases/alabama/supreme-court/1995/1931296-1.html.

> *"A nuisance may merely be a right thing in the wrong place, -- like a pig in the parlor instead of the barnyard,"* Justice George Sutherland, *Euclid v. Ambler Realty Co.*, 272 U.S. 365, 388 (1926)

A business cannot unreasonably interfere with the rights of its neighbours by conducting a business that "by its nature would cause an unreasonable and continuous annoyance to the [neighbors], would prevent the enjoyment of their property, and would disturb the quietude and pleasure otherwise to be found in their homes".[22] "A trespass may be committed by disturbing the possession of the occupant, though the person [or legal entity] committing the trespass does not actually go on the premises, *as by throwing water* or missiles on the land, or removing a partition fence, though the trespasser does not place his foot on the land."[23] Indirect trespass is established by showing

"1) an invasion affecting an interest in the exclusive possession of his property;
2) an intentional doing of the act which results in the invasion;
3) reasonably foreseeability that the act done could result in an invasion of plaintiff's possessory interest; and
4) substantial damages to the Res."[24]

In rejecting the dimensional test, and substituting in its place a force and energy test to support a finding of trespass, the Supreme Court of Oregon, in *Martin v. Reynolds Metals Co.*, (1960),[25] stated:

> "The view recognizing a trespassory invasion where there is no 'thing' which can be seen with the naked eye undoubtedly runs counter to the definition in some quarters. Restatement, Torts § 158, Comment H (1934); Prosser, Torts § 13 (2d Ed. 1955). It is quite possible that in an earlier day when science had not yet peered into the molecular and atomic world of small particles, the court could not fit an invasion through unseen physical instrumentalities into the requirement that a trespass can result from a *direct* invasion. But in this atomic age even the uneducated know the great and awful force contained in the atom and what it can do to a man's property if released. In fact, the now famous equation $E = mc^2$ has taught us that mass and energy are equivalents and that our concept of 'things' must be reframed. If these observations on science in relation to trespass should appear theoretical and unreal in the abstract, they become very practical and real to the possessor when the unseen force cracks the foundation of his house. The force is just as real if it is chemical in nature and must be awakened by the intervention of another agency before it does harm.
>
> "If, then, we must look to the character of the instrumentality which is used in making the intrusion upon another's land we prefer to emphasize the object's energy or force rather than its size. Viewed in this way we may define trespass as an intrusion which invaded the possessor's protected interest in exclusive

[22] Ibid.
[23] *Louisville & Nashville Railroad v. Higginbotham*, 44 So. 872 (Ala. 1907). Louisville & Nashville Railroad v. Higginbotham, 44 So. 872, 153 Ala. 334, 1907 Ala. LEXIS 123 – CourtListener.com.
[24] *Borland v. Sanders Lead Co.*, 369 So. 2d 523, 529 (Ala. 1979). https://www.quimbee.com/cases/j-h-borland-sr-v-sanders-lead-co.
[25] *Martin et ux v. Reynolds Metals Company*., 221 Or. 86 (1960 342 P.2d 790. https://casetext.com/case/martin-et-ux-v-reynolds-metals-co.

> possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist."
> "We are of the opinion, therefore, that the intrusion of the fluoride particulates in the present case constituted a trespass."

In deciding what acts constitute a trespass, the Oregon Supreme Court "cited earlier cases [*McNeill v. Redington*, 67 Cal App2d 315, 154 P2d 428 (1945)[26] and *Bedell, et ux v. Goulter, et al.*, 199 Or 344, 361, 261 P2d 842 (1953)[27]] recognizing that a trespass is committed by a defendant's blasting operation when the vibrations and concussions to earth and air cause damage to the plaintiff's property." Aggregate extraction operations in any location, while essential for various construction and industrial processes, inherently cause significant environmental and community impacts. These operations, particularly in areas of high human and non-human activity, can lead to substantial and lasting adverse effects. In Ontario, the indefinite nature of pit and quarry licenses and the lack of restriction on the depth of extraction exacerbate these issues, making it crucial to understand the extensive environmental footprint and cumulative impact these operations have. As aggregate extraction operations grow ever larger, their environmental footprint extends far beyond the site's boundaries, with lasting effects, including sterilization of sensitive lands in the surrounding zone of influence.

The following points highlight the primary contaminants and potential consequences of aggregate extraction operations:

- *Significant Environmental Damage:*
  - Aggregate extraction operations inherently cause substantial environmental damage.
  - These impacts are especially severe in areas of high human activity, such as Settlement Areas and Rural Clusters, and areas of high non-human activity.
- *Community Dependence:*
  - Communities in these areas depend on a resilient and sustainable environment for long-term health, safety, and welfare.
- *License Without Expiry Date:*
  - In Ontario, a license to permit aggregate extraction has no expiry date, effectively rendering adverse effects from their operations permanent.
- *Expanding Environmental Footprint:*
  - As aggregate extraction operations grow, their environmental footprint extends far beyond the site's boundaries, leading to lasting adverse effects, including family health impacts such as respiratory issues, stress and sleep disturbances due to dust (Krouse, 2021) and noise pollution, as well as the sterilization of sensitive lands and an increasing radius of influence. The increase in the environmental footprint has rendered the 1995 provincial D-6 guidelines for preventing the encroachment of heavy industrial (Class III) uses and sensitive land uses on one another increasingly irrelevant, and a

[26] https://casetext.com/case/mcneill-v-redington.
[27] https://casetext.com/case/bedell-et-ux-v-goulter-et-al.

1,000-metre zone of influence is no longer an adequate benchmark.[28] Over the past 30 years, there has been growing public awareness and scientific advances in understanding the deleterious impacts of aggregate extraction operations. Further, post-COVID19, in combination with advances in Artificial Intelligence (AI), more people are now combining work, online learning, e-shopping, gaming, entertaining indoors and outdoors, growing vegetables, raising children, etc., in a 24-7 home environment. This lifestyle shift exposes communities to the adverse effects of aggregate extraction operations round the clock, effectively in perpetuity, as a license to permit aggregate extraction operations in Ontario has no expiry date. As a result of these dynamic and evolving factors, it is imperative to update the provincial guidelines to more accurately reflect aggregate extraction operations' expanding environmental footprint and prevent land use incompatibility,[29]as other jurisdictions have done. There is no entitlement for anyone, legal entity, or occupant to use their property in a way that directly or indirectly disrupts or interferes with the use and enjoyment of neighbouring third-party property, or sterilizes the right to develop, expand an existing use, or redevelop such property, without permission or compensation. To do otherwise is a *de facto* taking of property rights without compensation (Sevelka, 2023).

- *Cumulative Impact:*
    - The cumulative impact of multiple aggregate extraction sites within a region can exacerbate environmental damage and make it more difficult to mitigate the adverse effects to a trivial level.

Operations of Pits and Blasting Quarries lead to numerous impacts that align with the definition of *Adverse Effects* as defined in the 2024 Ontario Provincial Planning Statement. In many instances, the identified adverse effects have cascading impacts. Here are some specific examples:

a) Impairment of the Quality of the Natural Environment for any use that can be made of it

- *Air Pollution*: Fugitive dust and toxic fumes from blasting and extraction processes can reduce air quality, affecting the natural environment and its usability.
- *Water Pollution*: Contaminated runoff can degrade local water sources and affect groundwater quality, impairing their use for drinking, irrigation, and other purposes.

[28] D-6 Compatibility between Industrial Facilities. D-6 Compatibility between Industrial Facilities | ontario.ca.

[29] "Some of the most obvious examples of potential online substitutes for in-person activities are remote work, virtual learning, tele-health, virtual conferences, e-commerce, and online gaming. For each of these activities, many people may choose to participate online on one occasion and in person on another. The emergence of this type of hybrid lifestyle points to a need for planners to integrate a new skill set of considerations into their work. In addition this blending of real world and digital world experiences has the potential to provide unique opportunities for planning when it comes to resolving challenges in the build environment, such as accessibility, or when co-creating with the community in equitable ways (2024 APA Foresight, Trend Report for Planners, p. 47)." https://www.cip-icu.ca/wp-content/uploads/2024/02/2024-Trend-Report-for-Planners.pdf 6.

- *Groundwater Depletion*: Continuous dewatering lowers the water table, impacting the availability of groundwater for natural and human use.
- *Groundwater Contamination*: Removal of the natural filtration capacity leads to potential contamination of groundwater with pollutants from the extraction site.
- *Long-term Hydrological Changes*: Changes in groundwater flow patterns and depletion of aquifers (over-exploitation) can impair the natural environment's ability to support various uses.
- *Vibrations*: Persistent vibrations can disrupt the natural environment, affecting wildlife and potentially altering ecosystems. They can also impact the structural integrity of natural features like rock formations.
- *Vegetation Damage*: Flyrock debris can physically damage trees and plants, impairing the natural beauty and usability of the environment for recreation and other purposes.
- *Loss of Agricultural Farmland*: Aggregate extraction can lead to the permanent loss of agricultural land, impacting the natural environment's ability to support agricultural production and food security. According to the 2016 Census of Agriculture, Ontario has experienced a daily loss of 319 acres of farmland, which means an annual loss of 116,435 acers, and approximately 1,163,435 acres over 10 years.[30]
- *Heat Island Effect*: Removal of vegetation and soil, coupled with exposed heat-absorbing surfaces from pit and quarry operations, increases local temperatures (De Carolis, 2012). This phenomenon, known as the heat island effect, impairs the natural environment by:
    - *Increased Local Temperatures*: Elevated temperatures reduce the usability of the environment for recreational and residential purposes, making outdoor activities less enjoyable and potentially hazardous during extreme heat events.
    - *Impact on Ecosystems*: Higher temperatures can disrupt local wildlife and plant species, affecting biodiversity and ecological balance. Some species may struggle to survive or reproduce, leading to shifts in the local ecosystem.
    - *Air Quality*: Increased temperatures can exacerbate air pollution, particularly the formation of ground-level ozone, which negatively impacts both the natural environment and human health.
    - *Energy Demand and Cost*: Higher temperatures lead to increased energy use and cost for cooling, contributing to higher greenhouse gas emissions and further environmental degradation.
- *Cumulative Environmental Impacts:* The combined environmental effects of multiple operations can lead to significant degradation of the natural environment.

b) Injury or Damage to Property or Plant or Animal Life

- *Direct Damage to Trees:* The impact of flyrock debris can break branches, strip bark, or even uproot trees, causing long-term damage to forested areas.

[30] "Ontario farmland under intense pressure," *OFA*, June 10, 2022. https://ofa.on.ca/newsroom/ontario-farmland-under-intense-pressure/?form=MG0AV3.

- *Ecosystem Disruption*: Damage to tree stands can disrupt local ecosystems, affecting the species that rely on these habitats.
- *Chemical Spills*: Accidental spills of fuels, lubricants, and other chemicals used in aggregate extraction operations can cause severe damage to plant and animal life.
- *Flyrock Debris*: Rock fragments ejected during blasting can cause physical damage to surrounding properties and endanger plant and animal life.
- *Habitat Destruction:* The physical alteration of landscapes can destroy habitats for local flora and fauna, leading to injury or damage. The loss of pollinators (such as bees, butterflies and other insects) would directly impact plant life by reducing the ability of plants to reproduce, leading to diminished biodiversity and ecosystem health. This in turn would have a broader impact on animal life that depends on these plants for food and habitat (Valentine, 2024).[31]
- *Land Subsidence*: The removal of large volumes of groundwater can cause the ground to sink, leading to structural damage to buildings and infrastructure.
- *Induced Seismicity*: Seismic events can cause structural damage to buildings and infrastructure (e.g., roads, bridges, utilities, etc.) as well as harm to plant and animal life.

c) Harm or Material Discomfort to Any Person

- *Noise Pollution*: Constant noise from machinery and blasting operations can cause stress and discomfort to nearby residents.
- *Vibrations*: Blasting-induced and truck-induced vibrations can be unsettling and disturbing to the local community, leading to material discomfort.
- *Ecosystem Disruption*: Lowering the water table affects wetlands, streams, and other aquatic ecosystems, which can indirectly cause harm or discomfort to people relying on these ecosystems.
- *Traffic Congestion:* Increased truck traffic can lead to significant delays and inconvenience for local residents, contributing to material discomfort.
- *Cumulative Environmental Impacts:* Persistent and cumulative impacts, such as noise, dust, and pollution, can cause material discomfort to residents over time.

d) An Adverse Effect on the Health of a Person

- *Respiratory Issues:* Fugitive dust and toxic fumes can lead to respiratory problems and other health issues among nearby residents.
- *Stress and Anxiety*: Continuous noise and vibrations from blasting can cause psychological stress and anxiety, adversely affecting mental health.
- *Reduced Water Quality*: Contaminated groundwater can lead to health issues for residents consuming or using the water.
- *Indirect Health Impacts*: The loss of trees and vegetation can reduce air quality and local climate regulation, potentially affecting human health indirectly.

[31] "Humans' pesticide use, greenhouse gas emissions and habitat destruction have sparked mass pollinator die-offs. Monarch butterfly numbers…have plummeted by 80 percent nationwide in the past two decades, and according to the Center for Biological Diversity's 2017 report, nearly one in four native bee species is imperiled and at increasing risk of extinction. 75 percent of North America's plant species rely on pollinators."

- *Health Monitoring*: Residents, at their own or taxpayer expense, will need to regularly monitor their health, including frequent medical visits due to air quality issues, stress from ongoing health concerns, and the long-term effects of exposure to pollutants.

e) Impairment of the Safety of Any Person

- *Explosive Hazards*: The use of explosives poses significant safety risks, including the potential for accidental explosions and injuries.
- *Flyrock Hazards*: Ejected debris during blasting operations can pose direct safety threats to individuals in the vicinity.
- *Fallen Debris*: Damaged trees or branches caused by flyrock debris can pose safety risks if they fall, particularly in areas frequented by people.
- *Induced Seismicity*: Blasting and dewatering activities induce seismic events, posing risks to the safety of nearby residents and structures.
- *Reduced Visibility*: Fugitive dust can impair visibility, creating hazards for vehicular traffic and cyclists.
- *Traffic Accidents*: The increased presence of heavy trucks on local roads raises the risk of traffic accidents, posing significant safety concerns for residents and other road users.
- *Road Wear and Tear*: The heavy loads carried by aggregate transport trucks can damage roads and bridges, increasing the risk of accidents and impairing the safety of drivers, cyclists and pedestrians.

f) Rendering Any Property or Plant or Animal Life Unfit for Human Use

- *Land Degradation*: Permanent alteration of the landscape can render the land unfit for future agricultural, residential, or recreational use.
- *Water Contamination*: Polluted water sources can become unsuitable for human and non-human consumption and agricultural irrigation.
- *Vibration Damage*: Structural damage caused by vibrations from blasting, heavy machinery, or truck traffic can render buildings and other properties unsafe or unsuitable for use, leading to condemnation.

g) Loss of Enjoyment of Normal Use of Property

- *Noise and Dust*: Persistent noise and dust from heavy machinery, blasting operations and transport trucks can significantly reduce the quality of life and enjoyment of property for nearby residents.
- *Blasting Noise and Vibrations*: The disturbances from noise and vibrations can significantly reduce the enjoyment of property for nearby neighbours.
- *Odours*: Unpleasant odours from aggregate extraction operations, such as those from machinery and chemicals, can make outdoor activities and even indoor living uncomfortable for nearby residents, further reducing their enjoyment of their properties.
- *Light Pollution*: Operations that continue during nighttime hours can produce significant light pollution, disturbing sleep patterns and night-time activities for nearby residents.
- *Visual Impacts*: The visual intrusion of large-scale operations can diminish the aesthetic value of surrounding properties.

- *Traffic Congestion*: Increased truck traffic can lead to significant delays and inconvenience for local residents, reducing the enjoyment of their properties due to noise, safety concerns, and the disruption of their daily lives.
- *Social and Economic Impacts*: Displacement and changes in land use patterns, along with the curtailment of various economic opportunities through land use incompatibility, can significantly reduce residents' quality of life and enjoyment and use of their property, resulting in a loss in property value.
- *Property Value Impacts:* According to the judge in *Parker Mountain Aggregates Limited v. Nova Scotia (Minister of Environment)*, (2010),[32] properties within 1,000 metres of the quarry would experience a decline in value. The Supreme Court of Nova Scotia judge described the situation as follows:

  > [16] Angela Vroom does not have a structure within 800 metres of the quarry. However, that does not mean she is unaffected by virtue of living 1000 metres from the quarry. She will clearly be affected by blasting, dust, traffic as well as run-off and damage to her property. It is not just speculation that Ms. Vroom, as well as the other Applicants, will experience a decline in the value of their properties. Such a decline will be a direct result of the development and operation of the quarry.

- *Safety Concerns*: Continuous blasting and vibrations can create an environment of fear and discomfort, affecting the quality of life.
- *Forced Preventive Measures by Residents:* An unwarranted reverse onus on innocent third parties to mitigate the potential adverse effects of odours, fugitive dust and toxic fumes would compel residents to install air purifiers or HVAC filters at significant personal expense to reduce indoor air pollution. They might also need to wear masks, particularly outdoors, to filter out dust and harmful particles, and keep their homes sealed by closing windows and doors to prevent the entry of dust, odours and toxic fumes into their living spaces. Additionally, residents may have to plant trees or build barriers to help reduce dust and odours from reaching their homes, incurring further costs. Despite these efforts, the issues could persist. Toxic fumes (a plume) from blasting (detonating explosives) cannot be readily mitigated, as they can bounce over or bypass physical barriers. In locations such as Ontario, Canada, where a License to permit aggregate extraction has no expiry, residents may be forced to move to less affected areas to avoid continuous and unrelenting exposure to odours, fugitive dust and toxic fumes, selling their homes at a depreciated price and a loss of homeowner equity, assuming they can sell their homes at all.

h) Interference with Normal Conduct of Business

- *Increased Insurance Costs:* Proximity to aggregate extraction operations can lead to higher insurance premiums for businesses due to increased risks.
- *Traffic Congestion*: Increased traffic from aggregate extraction operations can hinder the normal flow of commerce and transportation in the area.
- *Property Value Depreciation*: The presence of pits and quarries can decrease property values, affecting local businesses (including home occupations and industries) and investments.

[32] *Parker Mountain Aggregates Limited v. Nova Scotia (Minister of Environment)*, 2010 NSSC 277 (CanLII), <https://canlii.ca/t/2bjb4>, retrieved on 2024-12-22.

- *Social and Economic Impacts*: Economic consequences, such as loss of livelihoods and decreased property values, can interfere with the normal conduct of business in the area.

Special Case – Potential Cascading Environmental Impacts

Extraction of limestone and dolomite can encounter groundwater-filled cavern systems capable of causing significant environmental damage with cascading effects. While blasting and groundwater removal might appear to cause sudden, catastrophic sinkholes and other karstic features, it is the pre-existing karst formations and their geologic/hydrogeological characteristics that are fundamentally responsible. Mining activities, including pumping out water and extracting aggregate, simply amplify these features and bring them to the surface. In limestone terrains, karst is unavoidable, and remediation of karstic zones is prohibitively expensive (Lolcama, Cohen and Tonkin, 2002). Permitting aggregate extraction in a known karstic environment is a highly contentious issue, and needs to be approached with extreme caution, with investigations conducted by a hydrogeologist specially trained in karst.

Cascading Impacts of Encountering Karst

1. *Sinkhole Formation:*
   - Rapid Sinkholes: Sudden ground collapse can cause damage to infrastructure, property, and natural habitats.
   - Progressive Subsidence: Slower ground subsidence can gradually damage buildings and roads, leading to long-term maintenance challenges.
2. *Groundwater Contamination:*
   - Pollution Pathways: The dissolution of carbonate rocks creates voids and conduits that allow pollutants to travel quickly through the groundwater system, risking contamination of drinking water sources.
   - Reduced Natural Filtration: The lack of natural filtration in karst terrains means that contaminants can easily reach aquifers, impacting water quality.
3. *Hydrological Instability:*
   - Unpredictable Water Flow: Complex underground drainage systems can lead to unpredictable changes in surface and groundwater flow, affecting water availability for ecosystems and human use.
   - Increased Flooding: Alterations in the groundwater system can result in increased surface flooding, particularly in quarries and pits.
4. *Structural Integrity Issues:*
   - Fracture and Erosion: Blasting and extraction activities can widen fractures and erode sedimentary fill, further destabilizing the ground.
   - Cavern Systems: Encountering large cavern systems can lead to operational challenges and potential shutdowns due to safety concerns.
5. *Ecosystem Disruption:*
   - Habitat Loss: The unique ecosystems supported by karst landscapes can be highly sensitive to disturbances, leading to loss of biodiversity.
   - Hydrological Changes: Alterations in water flow can impact the flora and fauna dependent on stable groundwater levels.

6. *Economic Impacts:*
   - Remediation Costs: Addressing karst-related issues can be extremely expensive, requiring specialized techniques and costly long-term monitoring.
7. *Community and Social Impacts:*
   - Health Risks: Contaminated groundwater poses health risks to nearby communities relying on well water.
   - Property Damage: Sinkholes and ground subsidence can damage homes and infrastructure, leading to financial losses and potential displacement of residents.

These factors highlight why aggregate extraction is viewed as highly detrimental to both the environment and local communities, raising deep concerns for individuals potentially impacted by a Pit or Quarry, whether onsite or offsite. Furthermore, the long-term consequences of habitat destruction, water contamination, and ecosystem disruption underscore the urgent need for stringent land use planning and zoning policies that prioritize sustainability over destructibility. The process of aggregate extraction results in significant habitat destruction, loss of biodiversity, and soil erosion, which disrupt ecosystems and watercourses. According to the Provincial Planning Statement (Provincial Planning Statement, 2024), "*ecological function* means the natural processes, products or services that living and non-living environments provide or perform between species, ecosystems and landscapes. These may include biological, physical and socioeconomic interactions (PPS, 2024, p. 42)," and are recognized as *negative impacts* (PPS, 2024, p. 48).[33]

Disclosure Obligations and Legal Requirements for Sellers and Realtors in Ontario

In Ontario, both sellers and realtors are legally bound by the Trust in Real Estate Services Act (TRESA), Bill 145, enacted on March 4, 2020. This statute mandates the disclosure to prospective purchasers of any known applications for a nearby pit or Quarry and the existence of a nearby Pit or Quarry, which can remain operational indefinitely. This requirement ensures that all material facts that could influence a property's value or desirability are communicated to and acknowledged by prospective buyers. Value-influencing information in a real estate transaction is often asymmetrical (Kurlat and Stroebel, 2014), with the seller possessing critical knowledge not readily available to the buyer.

Material Facts:

Material facts are defined as those that would affect a reasonable person's decision to acquire an interest in real estate. According to the Real Estate Council of Ontario (RECO), which administers TRESA, material facts[34] include, but are not limited to:

- *The intended use of the property*: Information about how the property can be legally used or developed.

[33] Negative impacts c) in regard to other *natural heritage features and areas*, degradation that threatens the health and integrity of the natural features or *ecological functions* for which an area is identified due to single, multiple or successive *development* or *site alteration* activities, PPS, 2024, p. 48)

[34] Material Facts, RECO Bulletin No. 7.3, effective December 1, 2023. RECO Bulletin No. 7.3 Material facts.

- *Zoning by-laws*: Established by the municipality, region or other governmental agencies, these impact the legal use of the property.
- *Rights-of-way, allowances, or restrictions*: Any easements or restrictions on the use of the property established by the municipality, region, or other governmental agencies, or otherwise on the title.
- *Existence of nearby businesses or facilities*: Facilities that may impact quality of life (e.g., quarries, industrial facilities, airports, rail lines, etc.).

Specific Material Facts Related to Pits and Quarries:

- *Application for a Pit or Quarry*: The existence of an application for a Pit or Quarry nearby is a material fact that could affect the property's value and desirability. Prospective buyers need to be made aware of any potential future developments that may impact their decision.
- *Existing Pit or Quarry*: The presence of an existing Pit or Quarry is a material fact that could affect the property's value and desirability due to factors such as noise, dust, odour, toxic fumes, vibrations, flyrock debris, traffic, and visual impact.

Agent Disclosure:
Ensuring such information is disclosed in writing protects all parties involved and guarantees transparency in the transaction process. Agents must provide this information to potential buyers to facilitate informed decision-making.

Acknowledgement and Informed Consent:
Written confirmation of the material facts from the prospective purchaser, obtained on a "best efforts" basis, is required. This means sellers and realtors must make a genuine effort to ensure that buyers are fully informed about all relevant facts before completing the transaction. This process includes:

- *Providing Detailed Documentation*: Comprehensive information about material facts should be compiled and shared with potential buyers.
- *Clear Communication*: Ensuring that the information is conveyed in a manner that is easily understood.
- *Confirmation of Understanding*: Obtaining written acknowledgement from the buyer that they have received, reviewed and understood the material facts.

The following warning clause in a Residential Subdivision Agreement dated November 20, 1998, registered against the title of the single-family dwellings in a plan of subdivision in Burlington, Ontario, next to a blasting quarry, does not conform to the requirements of "informed consent," as required by RECO under the Trust in Real Estate Services Act (TRESA) enacted in March 2020.

Warning Clause

The following warning clause shall be registered on title and included in all development agreements and Offers of Sale and Purchase or Lease of all lots:

> "The purchaser/tenants acknowledge the presence of a future extractive industrial land use to the west and that extraction may take place during the daytime only."[35]

Informed consent requires that the buyer fully understands the implications of the nearby extractive industrial land use, including potential impacts on their quality of life, property value, and any other relevant factors. To meet the legal requirement of informed consent, the disclosure must be more comprehensive and clearly explain the potential effects of quarry operations, not just limit the information to extraction times. It should also ensure that the buyer acknowledges and understands this information in writing before proceeding with the transaction.

This was not an appropriate location for a residential subdivision. Conversely, permitting a future blasting quarry in close proximity to the residential subdivision is inconsistent with the concept of permanent land use compatibility. It reflects a municipal land use planning failure with no apparent awareness or understanding of the array of deleterious effects, including the potential health risk of long-term exposure to silica dust and the potentially deadly consequences of flyrock debris, an inevitable by-product of blasting (detonation of explosives). Since a licence in Ontario to permit aggregate extraction has no expiry date, the impacts from the aggregate extraction operations are effectively permanent, affecting present and future homeowners and tenants, unless voluntarily terminated or ordered terminated.

An impacted third-party property owner (seller), to preserve the value of their property, may choose not to disclose the material facts and retain an outside realtor with no geographic understanding of the local market. This can render both the vendor and realtor potentially liable for damages sustained by an uninformed buyer.[36] Even with disclosure, depending on the nature and extent of the existing or potential impacts, and how proximate the property is to the existing or proposed aggregate extraction operation, the property may not be saleable at any price. Ultimately, the owner of the proposed or existing Pit or Quarry should be held responsible for the loss in property value experienced by third-party property owners (i.e., vendors), who are innocent victims not participating in or sharing the profits of the private for-profit corporation directly responsible for the financial losses.

Aggregate Extraction Inconsistent with Climate Change

In 2017, the Town of Caledon joined the Global Covenant of Mayors for Climate and Energy (GCOM), an international alliance of 7,500 cities and local governments, including 24 Canadian municipalities. GCOM promotes local climate change actions to lower greenhouse gas (GHG) emissions and foster a resilient society.[37] *"Climate change*

[35] Tyandaga Environmental Coalition Inc. (TEC). (2016, December). https://burlingtonpublishing.escribemeetings.com/filestream.ashx?DocumentId=10709.

[36] "What Information Must Sellers Disclose in Canadian Real Estate Transactions," *JK Law*, September 6, 2023. https://www.jklawoffice.ca/blog/real-estate-disclosure-requirements-canada-sellers-must-reveal/.

[37] GCOM (undated). Global Covenant of Mayors for Climate & Energy. Home - Global Covenant of Mayors.

begins with holes in the ground rather than in the atmosphere" (Sandberg, 2013). On May 21, 2024, the Town of Caledon formalized its first Green Development Standards (GDS) program to improve the sustainability and livability of communities for current and future residents. The program aims to ensure that all new buildings are net-zero and client-resilient by 2050. The Town is on track to achieve a 36% reduction in greenhouse gas emissions by 2030.[38]

The Town is committed to addressing climate change, an initiative strongly supported by its residents. In a survey of over 800 residents, 95% expressed concern about climate change, emphasizing priorities such as: "preserving green space and agricultural land, maintaining Caledon's rural character as the Town grows, and a focus on saving energy."[39] Four of the Town's key initiatives include:[40]

1. "Working with partners across Peel Region to support residents making their homes more energy efficient".
2. Encouraging "Caledon landowners (homes, schools, businesses, etc.)…[to] purchase potted saplings for their property to help expand Caledon's tree cover and improve carbon sequestration (Androff, 2021)."
3. Promoting the planting of native trees and gardens on private property.
4. Encouraging walking and cycling as sustainable modes of transportation.

Despite the Town's efforts to reduce its carbon footprint, which have the full backing of the community, aggregate extraction operations continue to threaten the achievement of a more sustainable environment. These operations permanently destroy the land and everything *on* or *in* it, as there is no restriction on the depth of extraction in Ontario. They are at odds with the Town's climate change initiatives, and inconsistent with the province's environmental planning policies.

The PPS (2024) document (Section 2.9) mandates that planning authorities "shall" plan to reduce greenhouse gas emissions and prepare for the *impacts of a changing climate* through approaches that:

a) support the achievement of compact, *transit-supportive*, and *complete communities*;
b) incorporate climate change considerations in planning for and the development of *infrastructure*, including stormwater management systems, and *public service facilities*;
c) support energy conservation and efficiency;
d) promote *green infrastructure*, *low impact development*,[41] and *active transportation*, protect the environment and improve air quality; and

[38] Staff Report 2021-0121. (2021, April 20). Resilient Caledon Community Climate Change Action Plan Update. filestream.ashx.

[39] Building a Resilient Caledon together! Climate Change Plan. https://www.caledon.ca/en/town-services/resources/Energy-Environment/Infographic.pdf.

[40] Climate Change (undated). Climate Change Projects and Programs. Climate Change - Town of Caledon.

[41] Pits and Quarries are generally not considered *low impact developments* due to their significant environmental footprint, which includes habitat disruption, deforestation, pollution, and landscape alteration. This is contrary to the principles of Low Impact Development ((LID), which aim to minimize environmental impacts and promote sustainable land use.

e) take into consideration any additional approaches that help reduce greenhouse gas emissions and build community resilience to the *impacts of a changing climate*.

A record-shattering $8.5 billion in weather-related insurance losses in Canada in 2024 serves as a clarion call for both government and individuals to prioritize climate resilience. The 2024 total is nearly triple the total insured losses recorded in 2023 (Hoikstra, 2025).

Enhanced Environmental and Community Impacts of Large-Scale Aggregate Extraction Operations

Pits and Blasting Quarries vary significantly in size depending on their purpose and location. The global aggregate industry has experienced a trend toward larger, more consolidated operations. This expansion has led to greater and more sustained environmental impacts, affecting both human and non-human inhabitants. This is particularly evident in jurisdictions like Ontario, Canada, where licenses to permit aggregate extraction have no expiry date. Here are some general estimates:

- *Pits:* The size of a typical pit can range from a few acres to several hundred acres, depending on the depth and extent of the excavation.
- *Blasting Quarries*: Blasting quarries are generally larger, often spanning several hundred acres. These quarries are designed to extract large volumes of rock and aggregate, so they tend to cover more extensive areas.

The size, scale, intensity, and duration of a pit or blasting quarry operation have substantial and severe impacts on sensitive land uses and areas of significant human and non-human activity.

Size

- *Noise and Vibrations*: Larger operations have a broader footprint, resulting in more extensive noise and vibrations, affecting nearby sensitive areas such as schools, hospitals, and residential areas, and areas of significant human and non-human activity.
- *Dust and Air Quality*: Bigger quarries produce more dust and emissions, leading to poorer air quality, which can cause respiratory issues for people living or working nearby.
- *Visual Impact*: Larger quarries are more visually intrusive, altering the natural landscape and reducing property values in the surrounding areas.

Scale

- *Traffic and Infrastructure*: Larger-scale operations require more truck traffic for material transport, leading to increased wear on local roads and bridges and potential safety concerns for residents. In *Hall v. North Montgomery Materials* (2008),[42] a 220-acre quarry operation with 100 to 120 trucks going in and out of the quarry daily, with each truck weighing 88,000 pounds when fully loaded, was ruled a public nuisance. One of the inevitable consequences was defective

[42] *Hall v. North Montgomery Materials*, 39 So. 3d 159 (Ala. Civ. App. 2009). https://casetext.com/case/hall-v-north-montgomery-materials.

and dangerous roads, posing a special injury to local residents different from the common injury to the general public. The Alabama Appeals Court ruling provides an insightful analysis of the common law of nuisance on public highways:

> "At common law, any obstruction which unnecessarily incommodes or impedes the lawful use of a highway by the public is a nuisance." 148 Pa. at 363, 23 A. at 1116. Although the court recognized that the quarry had a right to reasonable use of the public highways, the court observed, "[i]t is quite another matter to occupy a particular road continuously, for such purpose, to the inconvenience of the public, and peril to persons using such road." 148 Pa. at 364, 23 A. at 1116. As *Allen* illustrates, the continuous use of a public road in such a manner as to deprive the traveling public of their full and intended use of the road amounts to a nuisance. *Cf. People v. Linde*, 341 Ill. 269, 275[43], 173 N.E. 361, 363[44] (1930) (taking judicial notice of the fact that "the use of public roads by vehicles of excessive weight is calculated to result, not only in injury to [the roads], but also in danger to all who travel such thoroughfares"); *Hancock v. Terry Elkhorn Mining Co.*, 503 S.W.2d at 719[45] (affirming the issuance of an injunction requiring a mining company to maintain highways that had been destroyed by overweight coal trucks that "constituted an extremely serious hazard to the traveling public in its attempt to use the damaged roads"); *State ex rel. Brook-side Poultry Farms, Inc. v. Jefferson County Bd. of Adjustment*, 125 Wis.2d 387, 398[46], 373 N.W.2d 450, 455[47] (1985) (in refusing to substitute its judgment for that of a county board of zoning adjustment, the court noted that the board had "heard extensive testimony on the truck and equipment traffic that would be generated by a [poultry] operation — as many as fifty-nine trips per day would be made by tractors, trucks and manure spreaders over narrow, hilly, curving, shoulder-less roads — and concluded that such traffic could create a health and safety hazard in the area")."

- *Resource Utilization*: Larger-scale operations can significantly affect local water tables and availability, impacting both human and non-human populations and natural ecosystems. Extraction below the water table and below the depth of third-party wells causes domestic wells to go dry. This issue is particularly problematic in regions where multiple wells draw from the same aquifer, as the cumulative effect of pumping can significantly lower the water table, affecting groundwater availability for all users.
    - *Lowering of Water Tables:* Deep aggregate extraction can lower the water table, affecting domestic wells that draw water from the same aquifer.
    - *Cone of Depression*: Continuous groundwater pumping to maintain a dry working floor creates a cone of depression, lowering the water level

[43] https://casetext.com/case/the-people-v-linde#p275
[44] https://casetext.com/case/the-people-v-linde#p363
[45] https://casetext.com/case/hancock-v-terry-elkhorn-mining-company-inc#p719
[46] https://casetext.com/case/brookside-poultry-v-jefferson-county-ad-bd#p398
[47] https://casetext.com/case/brookside-poultry-v-jefferson-county-ad-bd#p455

in the surrounding area. This can lead to dry wells and inconsistent water supply for residents.
    - *Water Quality Issues*: Aggregate extraction can lead to potential contamination of groundwater and increased turbidity, making water less suitable for domestic use without additional treatment.
    - *Legal and Social Implications*: Reduction in water availability can lead to disputes between operators and residents, affecting community well-being.

Intensity:

- *Blasting Frequency*: Intense quarrying operations involve more frequent blasting (detonation of explosives), causing more noise, toxic plumes, vibrations, and more flyrock debris, which poses significant safety risks to sensitive land uses and areas of significant human and non-human activities.
- *Operational Intensity*: High-intensity operations often mean continuous machinery use, contributing to constant noise pollution and potential soil and water contamination.

Duration (Licenses in Ontario Have No Expiry Date):

- *Long-term Effects*: The longer a pit or quarry remains operational, the more prolonged its impact on the environment and community. Long-term operations can lead to cumulative environmental impacts, such as habitat destruction, soil degradation, and water pollution.
- *Community Disruption*: Prolonged quarrying activities and the presence of flyrock debris can create a sense of insecurity and fear among residents, disrupting the social fabric and economic stability of local communities, leading to reduced quality of life and displacement.
- *Lack of Prescribed Periodic Reviews***:**
    - *Performance and Adequacy of License Conditions*: One of the critical issues is the lack of prescribed periodic reviews of the performance or adequacy of license conditions by the Ministry of Natural Resources and Forestry (MNRF). Without mandatory regular assessments and updates, license conditions may become outdated or insufficient to address the evolving impacts of aggregate extraction operations. This oversight can lead to unchecked environmental degradation and prolonged negative effects on communities. The Auditor General's December 6, 2023 report (Office of the Auditor General of Ontario, 2021, 2023) found that only 35 percent of Ontario's pits and quarries were inspected over the past five years, and only between 36 and 52 percent were compliant, and of the 3,400 violations, less than one percent were referred for enforcement. The Auditor General's report "provides 18 recommendations and 31 action items to be implemented by the Ministry of Natural Resources and Forestry (MNRF) to regain control over a rapacious industry…with the Ministry…in agreement with just seven…[with] the remainder…acknowledged without providing a commitment for improvement (Morgan, 2024)."

Incorporating mandatory periodic reviews would ensure that the conditions under which pits and quarries operate remain relevant and effective in mitigating adverse impacts to

a trivial level. By addressing this gap, communities can better manage the risks associated with aggregate extraction and enhance their resilience and sustainability. The combined impact on sensitive land uses and human activities from aggregate extraction operations can be profound, particularly in jurisdictions such as Ontario, where licenses permitting aggregate extraction have no expiry date and no restriction on the depth of extraction. Awareness and understanding of these impacts allows municipalities to take proactive measures to protect sensitive land uses and human activities, and permanently avoid land use incompatibility. These measures can help ensure that the health, safety and well-being of the public are safeguarded, and that a sustainable environment is maintained for current and future generations.

Health and Environmental Impacts of Fugitive Dust and Toxic Fumes from Aggregate Extraction Operations

The health effects from fugitive dust and toxic fumes generated by operational Pits and Quarries can be quite serious. Onsite employees are exposed to dust and toxic fumes for approximately 8-hour shifts, 5 or 6 days a week, with access to protective gear. In stark contrast, offsite residents face continuous, around-the-clock exposure unprotected and are often unaware of the serious health risks.

Silica Dust: refers to fine particles of crystalline silica (silicon dioxide), a type of particulate matter that becomes airborne when materials containing silica, such as sand, stone, concrete, or brick, are cut, drilled, crushed, blasted or otherwise disturbed. This dust is a common byproduct of aggregate extraction processes, including quarrying and mining, where heavy machinery and explosives break down rocks and materials. These tiny particles, often invisible to the naked eye, can be inhaled deep into the lungs, posing serious health risks. There is no completely "safe" level of exposure to silica dust. Residents can develop chronic silicosis after 15 to 20 years of exposure to low to moderate levels of dust. The disease progresses from shortness of breath during physical activity to more severe symptoms such as fatigue, extreme shortness of breath, chest pain, and ultimately respiratory failure.[48]

Toxic Fumes: In addition to Silica Dust, refers to particulate matter (PM), Volatile Organic Compounds (VOCs), gases such as Nitrogen Oxides (NO_x) Sulfur Dioxide (SO_2) and Carbon Dioxide (CO), as well as heavy metals such as lead, mercury and arsenic. These substances can be released during various activities such as blasting, crushing and transporting materials. Continuous exposure to these toxic fumes can lead to serious health issues for both onsite workers and nearby residents.

Forced Measures by Residents: Offsite residents are forced to take proactive and evasive measures at their own expense, essentially shifting the burden of protection onto innocent third parties to safeguard the health and well-being of their families, pets and guests. Fugitive dust from a Pit or Quarry is typically classified as a "nonpoint source" of pollution. Nonpoint sources are diffuse and arise from multiple, often widespread sources. Fugitive dust from Pits and Quarries falls into this category because it can be generated from various activities and areas within the site, such as blasting, hauling,

[48] Canadian Centre for Occupational Health and Safety. CCOHS: Silicosis.

crushing, and storage of materials. This dust can then be dispersed by wind over a broad area, making it challenging to identify a single point of origin.

Mental Health Impacts: Continuous exposure to fugitive dust and toxic fumes from nearby Pits and Quarries can take a toll on the mental health of residents. The constant worry about potential health risks, coupled with the physical impact on the surroundings, often leads to chronic stress, anxiety and depression. This relentless anxiety can disrupt daily routines, interfere with sleep patterns, and diminish the overall quality of life. The psychological burden of living under the persistent threat of environmental hazards can also exacerbate existing mental health conditions.

Impact on Pets: Continuous exposure to fugitive dust and toxic fumes from nearby Pits and Quarries can also have serious effects on the health of pets.[49] Similar to humans, pets can develop respiratory problems such as coughing, difficulty breathing, and chronic respiratory disease due to fine particulate matter penetrating deep into their lungs. Additionally, dust and toxic fumes can cause eye irritation, leading to redness, tearing and discomfort, as well as skin irritation, resulting in rashes and itching. Pets that groom themselves frequently may ingest dust and toxic particles that settle on their fur, leading to gastrointestinal issues and potential poisoning. The stress and discomfort caused by environmental pollutants can also cause behavioral changes, such as increased anxiety, lethargy, and alterations in eating and sleeping habits. Prolonged exposure to pollutants can weaken pets' immune systems, making them more susceptible to infections and illnesses. Ensuring pets have a clean and safe environment is crucial for their health and well-being, with measures such as keeping them indoors during peak dust activity, providing clean water, and regular grooming helping mitigate some of these risks.[50]

Impact on Outdoor Amenities: Constant exposure to fugitive dust and toxic fumes severely restricts the use and enjoyment of accessory uses and outdoor/backyard amenities, such as play areas, patios, pools, hot tubs, flower and vegetable gardens, and clotheslines. Home gardens play a crucial role in enhancing food security, reducing rising food costs, and promoting sustainable living.[51] Dust and particulate matter can settle on plants, reducing their ability to photosynthesize and grow properly. It can also clog stomata, the tiny openings on leaves, affecting respiration. Toxic fumes can contaminate the soil and air, potentially harming plants and reducing their growth.

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[49] In the US alone, at least 70 percent of households own pets, according to the 2020-2021 APPA National Pet Owners Survey, and many of them are dogs. The truth about the environmental paw print of dogs (and cats) — and how to reduce it. https://ideas.ted.com/the-environmental-impact-of-dogs-and-cats-and-how-to-reduce-it/?form=MG0AV3.

[50] Research indicates that pets can act as biosentinels for environmental contaminants, meaning they can show early signs of exposure to harmful substances that also affect humans. See "Pets as Sentinels of Indoor Contamination," Pets as Sentinels of Indoor Contamination | SpringerLink; "Dogs can be 'early-warning systems' for toxic chemical exposure at home," Dogs can be 'early-warning systems' for toxic chemical exposure at home. https://link.springer.com/chapter/10.1007/978-3-030-30734-9_1?form=MG0AV3#citeas.

[51] Embrace home gardening for sustainable food security, *GNA*, November 15, 2024. Embrace home gardening for sustainable food security – MyJoyOnline. https://www.myjoyonline.com/embrace-home-gardening-for-sustainable-food-security/?form=MG0AV3.

Clotheslines, which are eco-friendly and cost-effective for air-drying laundry, also benefit from sunlight's natural disinfectant properties.[52]

Health Risks: The health risks associated with exposure to fugitive dust and toxic fumes are significant and include:

- *Silicosis:* A serious and irreversible lung disease caused by inhaling fine silica dust, common in quarrying operations. It can lead to permanent disablement and early death.
- *Asthma:* Exposure to dust can trigger or worsen asthma symptoms.
- *Chronic Obstructive Pulmonary Disease (COPD):* A group of lung diseases causing breathing difficulties.
- *Respiratory Infections:* Dust can carry harmful microorganisms that cause respiratory infections.
- *Heart Disease*: Long-term exposure to particulate matter is strongly associated with heart disease.
- *Stroke*: Increased risk of stroke due to exposure to dust and toxic fumes.

Impacts of Aggregate Extraction Operations on Renewable Energy Systems

As communities transition from non-renewable energy sources (coal, oil and gas) to renewable ones, efforts to eliminate greenhouse gases, reduce global warming and create a sustainable environment are becoming increasingly important. Older homes are being retrofitted with renewable and sustainable energy systems such as solar and geothermal, which are also becoming more common in new housing construction (McDiarmid, 2024). However, aggregate extraction operations pose health risks and can damage, reduce energy efficiency, and shorten the lifespan of solar and geothermal systems while increasing operating, maintenance, repair and replacement costs, disproportionately affecting innocent homeowners and tenants, as detailed below:

Solar Systems

- *Structural Seismicity:* Vibrations can cause micro-cracks in solar panels and mounting structures, potentially reducing their lifespan and efficiency (increasing third-party costs)
- *Alignment Issues:* Vibrations can misalign solar panels, affecting their optimal orientation towards the sun and reducing energy capture (increasing third-party costs).
- *Glass Damage:* Airblast can cause cracking or shattering of glass panels and windows, reducing the efficiency and lifespan of solar panels (increasing third-party costs).
- *Structural Damage:* The force of the airblast can damage mounting structures, leading to misalignment and reduced energy capture (increasing third-party costs).
- *Panel Efficiency:* Dust accumulation on solar panels reduces their efficiency by blocking sunlight (increasing third-party costs).

[52] How To Use An Outdoor Clothesline, How To Use An Outdoor Clothesline - Off-Grid Rebel.

- *Corrosion:* Toxic fumes can cause corrosion of metal components, reducing the lifespan of the system (increasing third-party costs)
- *Health Hazards:* Dust and toxic fumes can pose health risks to maintenance personnel (third-party harms).

Geothermal Systems

- *Induced Seismicity:* Vibrations can trigger seismic events, especially in geothermal fields where fluid injection or extraction alters subsurface pressures (increasing third-party costs) (Bromley and Majer, 2000).
- *Reservoir Stability:* Vibrations can affect the stability of geothermal reservoirs, potentially leading to reduced efficiency or damage of infrastructure (increasing third-party costs).
- *Reservoir Disruption:* Airblast can potentially disrupt the stability of geothermal reservoirs, affecting the efficiency of heat extraction (increasing third-party costs).
- *Infrastructure Damage:* Similar to solar systems, the force can damage the infrastructure associated with geothermal systems, such as pipes and wellheads (increasing third-party costs).
- *Air Quality:* Toxic fumes contaminate the air, affecting the health of workers and nearby residents (innocent third-party victims).
- *Equipment Damage:* Dust can clog filters and cooling systems, reducing the efficiency of geothermal plants (increasing third-party costs).

On January 7, 2025, the province of Ontario announced new and expanded energy efficiency programs, effective January 28, 2025, to help families and businesses reduce their electricity use and save money. The program offers rebates of up to 30 per cent of the cost of various upgrades, including rooftop solar panels and underground geothermal heat pumps.[53] However, aggregate extraction operations in the wrong geographic locations would undermine the program's effectiveness by reducing the efficiency and life span of the improvements, leading to increased annual maintenance and operating costs.

The Mirage of Professionalism: Examining Oppi's Shortcomings

The Ontario Professional Planners Institute (OPPI) lacks specific mandatory requirements for the development and reporting of so-called Planning Justification Reports, relying instead on "alignment with OPPI's independent Professional Judgment Standards." This individualized, self-serving "judgment" approach is not a particularly high bar, lacking transparency, and falls short of establishing rigorous, standardized criteria necessary for ensuring consistency, objectivity, and reliability in evaluating applications for Pits and Quarries on behalf of the Aggregate Extraction Industry. OPPI does not have a specific definition of "Land Use Planning," which leads to ambiguities and inconsistencies in evaluating land use applications for Pits and Quarries and unreliable planning opinions. Additionally, there is no explicit requirement for

[53] Ontario's New and Expanded Energy Efficiency Programs, January 7, 2025. https://news.ontario.ca/en/backgrounder/1005539/ontarios-new-and-expanded-energy-efficiency-programs

geographic competency, meaning planners may lack the essential understanding of specific regional contexts and unique local conditions that are critical for accurate and relevant planning assessments. The public has no effective means of judging the reliability or credibility of a planning report prepared by a Member of OPPI, which may explain why only 40 complaints have been filed with OPPI during a five-year period (c. 2019-2023), with only two resulting in a discipline hearing (Smith, 2024).

If a property owner suffers a financial loss as a result of professional negligence it is conceivable that an argument could be made against the organization that certified the professional and the organization may be held liable if its certifying standards are found to be unreasonably low (McKiggan, 2010). Section 1.0 of OPPI's Professional Code of Practice states that "Members have a primary responsibility to define and serve the interests of the public", a vague notion with no substantive criteria. Key elements of public interest, with the overarching goal the well-being of the community, typically include:

- *Public Safety*: Ensuring the safety and security of citizens.
- *Public Health*: Protecting and promoting the health and well-being of the population.
- *Economic Stability*: Supporting economic growth and stability for the benefit of society.
- *Environmental Protection*: Safeguarding natural resources and the environment for current and future generations.
- *Access to Education and Resources*: Ensuring equal access to education, information, and essential services.

Although the study of real property, tort and nuisance law is not required to become a Member of OPPI, a basic understanding of these legal areas is crucial for effective land use planning analysis, as Planners often encounter title restrictions, competing property rights and conflicting land uses such as land use incompatibility. Without formal education or training in these legal areas, and without a recognized or standard definition of "Land Use Planning," Land Use Planners are not equipped to assess the full spectrum of *adverse effects*, as defined in the 2024 Provincial Planning Statement, of Pits and Quarries on the *use, enjoyment* or *interference* with the legal rights of owners and occupants of both private and public third-party property (Sevelka, 2023).

Summary of the issues covered:

1. *Planning Justification Reports*: Planners' reliance on OPPI's independent Professional Judgement Standards lacks transparency and does not establish rigorous, standardized criteria necessary for consistency and reliability, potentially undermining public trust in planning processes.
2. *Definition of Land Use Planning*: The absence of a specific definition leads to ambiguities and inconsistencies in evaluating land use applications, which can result in decisions that do not adequately protect the public interest.
3. *Geographic Competency*: The lack of explicit geographic competency requirements means planners may not fully understand regional contexts, leading to potentially flawed planning assessments.
4. *Public Complaints and Discipline Hearings*: The low number of complaints filed with OPPI and the even lower number of discipline hearings could indicate

a lack of effective public oversight and accountability, limiting the ability of the public to hold planners accountable for their actions.

5. *Inadequate Standards*: The potential for unreasonably low certifying standards may result in the organization being held liable for professional negligence, potentially affecting public safety, health and welfare.
6. *Legal Education*: The lack of required formal education in real property, tort and nuisance law leaves planners ill-equipped to effectively handle title restrictions, property rights issues and land use conflicts, or to fully assess the adverse effects of Pits and Quarries, which can negatively impact the rights and interests of the public.
7. *Lack of Awareness of Legal Precedent*: OPPI does not emphasize or ensure that its members have an awareness and understanding of relevant legal precedents involving land use planning. This lack of awareness and understanding can lead to flawed planning assessments and decisions. Without a firm grasp of legal precedents, planners cannot adequately address the issues related to property rights, zoning laws, and other legal constraints, potentially resulting in decisions that adversely affect the community or that are not legally sound and could be challenged in court.

Navigating the Gaps in Oppi's Educational Framework

Membership in the Ontario Professional Planners Institute (OPPI) falls short in providing access to a specialized or organized body of relevant knowledge, unlike professions such as Real Estate Appraisal and Law. OPPI has no subject-specific public texts, no dedicated dictionary, no professional journal, no centralized library, and no standardized mandatory continuing education courses. The flexible options for continuing education credits available to Members of OPPI include an eclectic mix of structured and self-directed learning activities, such as "organized or guided walking tours" or "self-guided educational walking tours, site visits, or educational field study". The qualifying exam to become a Member of OPPI is a 3-hour multiple-choice test. Beyond the 3-hour test and the requirement for a four-year undergraduate degree, there are no additional academic requirements. OPPI publishes Y Magazine, a non-peer-reviewed trade publication issued twice a year, with word limits of 1,000 - 1,800 for Feature articles and 500 - 1,000 for Academic/research articles. OPPI also hosts an annual three-day conference. Established in 1986, OPPI has only been in existence for a relatively short period.

Bill 70, the Registered Professional Planners Act, 2019, aims to promote and protect the public interest by regulating the practice of professional planners in Ontario, but includes an important provision in Section 2, which does not prevent any person who is not a member of OPPI from practicing in the field:

> *2. This Act does not affect or interfere with the right of any person who is not a member of the Institute to practice in the field of professional planning.*

According to Bill 70,

> *"professional planning" includes the scientific, aesthetic and orderly disposition of land, resources, facilities or services, with a view to securing*

> *physical, economic and social efficiency, a sound environment, health and well-being and "professional planner" has a corresponding meaning.*

OPPI Members retain the exclusive right to use the designation "Registered Professional Planner", but do not enjoy an exclusive right to practice in this broadly defined and often unfocused field of professional planning, as practiced in Ontario. The "shotgun" definition of "professional planning" is so broad that it lacks specificity. Without specific criteria or boundaries, what exactly constitutes professional planning can be unclear. This ambiguity can lead to inconsistencies in how planning is practiced and interpreted across different regions and projects. There is a risk of varying standards and practices, which can undermine the reliability and consistency of planning reports and decisions. This lack of standardization can also make it challenging for stakeholders to measure and ensure the quality and effectiveness of planning work.

Despite the academic shortcomings of OPPI, municipal land use disputes at the Ontario Land Tribunal (OLT) are often resolved based on findings of "good planning" rather than "effective land use planning,"[54] relying on the testimony of planner expert witnesses.[55] Generally, a planning report entered into evidence that concludes with a statement to the effect that there are no *adverse effects* pursuant to the PPS (2024), without defining 'adverse effects' or if the planner is not sufficiently qualified to address such matters, could be ruled inadmissible due to lack of clarity, expert authority and reduced probative value.[56] Additionally, this testimony may be considered speculative[57] or biased, rendering it inadmissible. In *Bruff-Murphy et al. v. Gunawardena* (2017),[58] the Ontario Court of Appeal, specifically at para 2, noted that:

> "Appellate courts have repeatedly instructed trial judges that they serve as gatekeepers when it comes to the admissibility of expert opinion evidence. They are required to carefully scrutinize, among other things, an expert witness' training and professional experience, along with the necessity of their testimony in assisting the trier of fact, before the expert is qualified to give evidence in our courts…"

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54 Effective land use refers to the strategic and thoughtful planning, management and utilization of land resources to maximize their benefits while avoiding or minimizing negative impacts or *adverse effects* to a trivial level. "Effective land use planning ensures that lands, which are finite resources, are used and developed to meet the current and future needs of communities and the people who live in them, while safeguarding valuable resources such as agricultural lands, wetlands, forests, and distinctive natural features and landscapes….[with a focus on land use compatibility]. Municipalities then decide, through their own official plans and zoning by-laws, how lands within their jurisdiction are used (Value-for-money Audit: Land-Use Planning in the Greater Golden Horseshoe, December, 2021, P. 1)".

55 The Duty of the Expert appearing before the OLT must satisfy the requirements of Section 7.5 of the Rules of Practice and Procedure, effective December 2, 2024. https://olt.gov.on.ca/wp-content/uploads/OLT-Rules-and-Procedures.html.

56 *Moore v. Getahun*, 2015 ONCA 55 (CanLII), <https://canlii.ca/t/gg3lt>, retrieved on 2025-01-09.

57 In *R. v. Nettleton*, 2012 ONCA, 521, the court proactively addressed the creditability of the expert's evidence, in which the expert admitted to treating significant parts of his reports as "boilerplate" and acknowledged carelessness in their preparation, which then led to an appeal of *R v Hason*, 2024 ONCA 369, an earlier case in which the same expert testified. Case summary by Justin Denis and Jordan Lalonde, Field Law, June 2024. https://www.fieldlaw.com/News-Views-Events/233722/Truth-on-Trial-The-Impact-of-Unreliable-Expert-Witnesses?form=MG0AV3.

58 *Bruff-Murphy v. Gunawardena*, 2017 ONCA 502 (CanLII), <https://canlii.ca/t/h4c7f>, retrieved on 2025-01-13.

Lack of Awareness of TRESA:

While OPPI's Members are neither qualified nor expected to guesstimate the loss in value inflicted on innocent third-party property owners within an appropriate zone (radius) of influence by the negative externalities caused by aggregate extraction operations, they certainly would be expected to be aware of the negative impact on *use* and *enjoyment* on potentially impacted properties, an obvious *adverse effect*. This speaks to the lack of specific requirements of OPPI's Members to be aware of and understand the implications of the Trust in Real Estate Services Act (TRESA), Bill 145, enacted March 4, 2020, which requires sellers and realtors to disclose "material facts" to a potential buyer. According to the Real Estate Council of Ontario (RECO) Bulletin No. 7.3, effective December 1, 2023, "material facts" are described as those that would affect a reasonable person's decision to acquire an interest in real estate (i.e., real property).[59] A seller is caught in a classic "Catch-22": either disclose and receive a lower price for the property or don't disclose and be sued by an uninformed purchaser who paid more than market value.

For land use planning to be effective, equitable and produce predictable outcomes, applying a consistent and transparent analysis is crucial and must address each of the following key areas, with public health, safety and well-being prioritized:

1. Public Safety and Health:
- *Safety*: Ensures that developments do not pose risks to the public, such as through safe building practices and proper infrastructure.
- *Health*: Minimizes environmental health risks, such as air and water pollution, by regulating industrial activities and ensuring proper waste management.

2. Environmental Protection:
- *Sustainability*: Protects natural resources and promotes sustainable development, ensuring that environmental impacts are mitigated.
- *Biodiversity*: Helps preserve ecosystems and habitats, ensuring that flora and fauna are protected from destructive activities.

3. Economic Stability and Growth:
- *Efficient Land Use*: Promotes the efficient use of land, ensuring that areas are appropriately zoned for residential, commercial, industrial, and recreational use.
- *Investment*: Attracts investment by providing clear and predictable planning processes, which can enhance economic growth and job creation.

4. Community Well-being:
- *Quality of Life*: Ensures that communities have access to essential services, recreational spaces, and a healthy living environment.
- *Social Equity*: Promotes equitable access to resources and services, ensuring that all community members benefit from development.

5. Infrastructure Development:
- *Transportation*: Facilitates the development of efficient transportation networks, reducing congestion and improving connectivity.

[59] Material Facts, RECO Bulletin No. 7.3, effective December 1, 2023. RECO Bulletin No. 7.3 Material facts.

- *Utilities and Services*: Ensures the provision of essential utilities and services, such as water, electricity, and waste management, in a planned and efficient manner.

6. Adaptation to Climate Change:

- *Resilience*: Promotes the development of resilient communities that can adapt to the impacts of climate change, such as through flood management and green infrastructure.
- *Mitigation*: Supports initiatives that reduce greenhouse gas emissions, such as promoting public transport and energy-efficient buildings.

7. Conflict Resolution:

- *Land Use Conflicts*: Helps resolve conflicts between different land uses, such as residential versus industrial, ensuring that competing interests are balanced and harmonized.

Effective land use planning is essential for achieving practical, beneficial results, and for creating sustainable, healthy, and prosperous communities. It balances the needs of the population with environmental protection and economic growth, ensuring that development is both equitable and beneficial for current and future generations. The term "good planning" is vague and should be avoided, as it is a descriptor without substance.

Sensitive Land Uses in Context and Application Process

Understanding the concept of sensitive land uses is crucial for effective land use planning and policy development to ensure permanent land use compatibility, to protect the health, safety and well-being of the public, and to create a sustainable environment for current and future generations. Sensitive land uses refer to areas where routine activities are likely to experience adverse effects (including nuisance and trespass) beyond a "trivial" level, now and in the future, due to a proposed major industrial facility such as an aggregate extraction operation. The impacts from a proposed aggregate extraction operation increase dramatically along with the size, scale, intensity and anticipated duration (life span) of the operation. Here is a list of some key features to identify in a context analysis of an application seeking municipal approval to permit a Pit or Quarry:

Property and Land Use

1. *Pre-consultation Hearing*: A pre-consultation hearing in Ontario for a Pit or Quarry application must be conducted with complete impartiality and without influence peddling. To ensure fairness and transparency, the proponent must not receive preferential treatment. Implement strict conflict of interest policies to prevent planners and decision-makers from being unduly influenced by special interest groups or personal gain. Additionally, a community representative should participate in confidential pre-application hearings (Nussbaum and Spessot, 2017).
2. *Public Notification:* Notify potentially impacted property owners in a timely manner to provide an opportunity for meaningful stakeholder input and feedback.
3. *Disclosure of Land Holdings*: Proponent must provide disclosure of all land holdings forming part of the application and any adjoining lands in which the proponent has an existing or potential interest, either as a fee simple or leasehold

interest or by way of a right of first refusal. This disclosure must include the identification of any numbered companies or other entities used to hold such interest, and the ultimate beneficial owners of these entities to ensure full transparency and prevent concealment of unstated objectives.

4. *Internet Search*: Conduct an internet search of the address of the subject project to gather any relevant information, news articles, public records, or community feedback that might impact the project.
5. *Examine the Parcel Register*: For the proposed Pit or Quarry, examine the title in the applicable Land Titles Office and note ownership particulars, including any easements, rights-of-way, covenants or title restrictions that might limit how the property can be used.
6. *Neighbouring and Nearby Land Uses*: Provide a detailed physical description (location, legal description or municipal address), including the land use code assigned to each improved and unimproved property by the Municipal Property Assessment Corporation (MPAC) within an appropriate zone (radius) of influence.
7. *Lots of Record*:[60] Identify all *lots of record* which would be deprived of their right to be developed to the fullest extent permitted under the prevailing land use controls. This includes evaluating potential impacts on these properties and any legal or planning considerations that might arise, including the potential for loss in property value.

Community and Environmental Considerations

8. *Local Character and Context:* Describe the local character and context in detail, including historical events and notable figures.
9. *Potentially Incompatible or Sensitive Land Uses:* Identify these within proximity to the site and note any off-site constraints.
10. *Transportation Services*: Detail roads, active transportation (bicycle routes, pedestrian pathways/trails) and transit services in proximity to the site.
11. *Community Amenities*: Identify parks, schools, religious institutions, emergency services and other community amenities nearby.
12. *Cultural Heritage Resources*: Identify assets such as historic buildings and structures, archaeological sites or cultural landscapes within an appropriate radius.
13. *Natural Features and Hazards*: Describe natural features and hazards within an appropriate radius, including those identified by the municipality's land use schedules.
14. *Nearby Developments*: Identify any nearby active development applications and proposed area developments.
15. *Population Density*: Assess the current and potential population density in the area to understand the potential impacts on residents and the community.
16. *Impact Assessment*: Address potential impacts on sensitive land uses and feasibility of any proposed mitigation measures.

[60] This means a *lot* that is legally recognized and can be developed or conveyed according to local land use regulations.

17. *Visual Aids*: Include visuals such as maps, aerial photography/imagery, photographs and sketches to illustrate spatial relationships and local character and context.
18. *Planning Report Summary*: Include a "Scope of Investigations" describing the extent of the research and investigations conducted, the documents relied upon, summarizing key findings, and disclosing any hypothetical assumptions.
19. *Community Engagement*: Document any public consultations, meetings, or feedback sessions held with the community to gather their input and concerns regarding the Pit or Quarry project, which is a fundamental requirement of procedural fairness.[61]
20. *Written Submissions*: All written submissions must be included in the record and made readily available to the public on the municipality's website, which promotes transparency and procedural fairness.
21. *Disclosure of Benefits:* Clearly disclose any direct or indirect benefits that the proponent is providing to the municipality, including financial contributions, infrastructure improvements, or community programs, to ensure transparency and to assess whether these benefits could influence the approval of rezoning or Official Plan amendments.
22. *Proponent's History*: Document the proponent's history of aggregate extraction operations, including violations, public complaints and lawsuits, and reputation in the communities or jurisdictions in which it operates.
23. *Size, Scale, Intensity, and Duration of the Aggregate Extraction Operation:*
    - Size of the Operation: Detail the total area of the land to be used for the aggregate extraction, including any expansions over time, with specific measurements and relevant maps or diagrams.
    - Scale of the Operation: Explain the capacity of the quarry or pit, including the volume of material to be extracted annually, and describe the machinery and equipment to be used, along with the number of workers employed.
    - Intensity of the Operation: Outline the daily operational hours and frequency of activities such as blasting, crushing, and transporting materials, and discuss the expected noise, dust, and vibration levels, along with any measures to mitigate these impacts.
    - Duration of the Operation: Provide an estimated timeline for the project's lifespan, from initiation through active extraction to site rehabilitation, and mention any planned phases or stages of the operation and the expected duration of each phase.

[61] Procedural fairness varies considerably in its content, depending on the context. Still, as described in *Baker v. Canada (Minister of Citizenship & Immigration)*, [1999] 2 S.C.C. '…underlying all these factors is the notion that the purpose of the participatory rights contained within the duty of procedural fairness is to ensure that administrative decisions are made using a fair and open procedure, appropriate to the decision being made and its statutory, institutional, and social context, with an opportunity for those affected by the decision to put forward their views and evidence fully and have them considered by the decision-maker."

Conflicting land use

The transfer over a property line of negative economic or environmental effects, including but not limited to: traffic, noise, vibration, odor, dust, glare, smoke, pollution, water vapor, mismatched land uses or density, height, or mass, mismatched layout of adjacent uses, loss of privacy, and unsightly views (*Loveland, Colo.).* The proximity of one or more land uses to another use when the former is not compatible with the latter; for example, an odious factory next to a rose garden (*Prince George's County, Md.)* (Davidson and Dolnick, 2004).

> "A failure to recognize and implement effective land use policies to protect against conflicting land uses leads to numerous public complaints, costly oversight and enforcement measures, and potential lawsuits related to nuisance and trespass. Lawsuits are not only time-consuming and expensive for both the municipality and residents but also unpredictable."

Definitions of Sensitive Land Uses

The definitions of sensitive land uses in different policy documents are explored, highlighting the implications for land use planning, particularly in the context of aggregate extraction operations. By examining the criteria and considerations for identifying sensitive land uses, the importance of permanently protecting these areas from potential negative impacts is underscored.

The following definitions encapsulate the essence of *sensitive land uses*:

> *Sensitive land uses:* [T]he term sensitive land uses means: buildings, amenity areas, or outdoor spaces where routine or normal activities occurring at reasonably expected times have the potential to experience an adverse effect, due to nearby major facilities or due to emissions that may be generated by the land uses permitted by this Plan within an Employment Area. Sensitive land uses may be a part of the natural or built environment, principal uses or accessory/ ancillary uses. Residential uses shall be considered sensitive land uses. Other examples may include, but are not limited to: daycare centres, and educational and health facilities. If the Plan permits a use in an Employment Area, the use is not a sensitive land use within that Employment Area for the purposes of this Plan, but may be a sensitive land use as defined in the Provincial Policy Statement and, if so, such land use may require noise, vibration, air quality, and/or odour studies as part of [a] complete application [to eliminate or reduce all adverse effects to trivial levels]. (Toronto Official Plan, Chapter 4, December 2023 Consolidation)
>
> *Sensitive land uses* means buildings, amenity areas, or outdoor spaces where routine or normal activities occurring at reasonably expected times would experience one or more adverse effects from contaminant discharges generated by a nearby major facility.[62] Sensitive land uses may be a part of the natural or built environment. Examples may include, but are not limited to: residences,

[62] *Major facilities* means facilities which may require separation from *sensitive land uses*, including but not limited to airports, manufacturing uses, transportation *infrastructure* and corridors, *rail facilities*, sewage treatment facilities, *waste management systems*, oil and gas pipelines, industries, energy generation facilities and transmission systems, and resource extraction activities. (2024 Provincial Planning Statement, p. 46)

> day care centres, and educational and health facilities. (2024 Provincial Planning Statement, p. 51)

Awareness of Land Use Compatibility, Methods of Avoidance, and Sustainability

The following excerpts from the Bedford, Indiana, Code of Ordinances[63] provide valuable insights into land use compatibility issues and methods of avoidance. The avoidance methods are globally applicable to land use planning and zoning policies, and are aligned with sustainability principles, offering a future-oriented vision.

> *Communities are constantly changing. As a community grows, it inherits the desirable characteristics of the past as well as some of the problems. Today, many communities are experiencing undesirable strip development, incompatible land use relationships, and traffic congestion on streets inadequately designed for current volumes. The primary cause for these problems is a lack of foresight and concern for general community goals. The result is lower property values, unequal taxing and general confusion about the function of an area. Compatible land uses are those which are similar to or complement each other….However, a low density residential development would conflict with a large industrial operation.*
>
> *On the edge of a community, there is generally a problem if a residential subdivision is developed adjacent to an existing agricultural operation. If there is cropland, the farmer will have to plow and fertilize the crops. This leads to complaints of dust and odor from the adjacent residents. If the agriculture operation is a feedlot, there are usually complaints about the odor.*
>
> *Many methods are available which can be used to modify or eliminate the effects of incompatible land uses. One accepted method is the development of a buffer zone between the incompatible uses. The buffer zone may consist of a type of development which is compatible to both uses or it may simply be a wide belt of open land developed with trees and shrubs and earth mounds….*
>
> *In many cases, there are residences mixed with incompatible commercial uses. This is true in other areas of the community where there is an abrupt change in land uses. This tends to have a depreciating effect on the assessed value of all properties in the immediate area. When an industrial use is permitted to infringe on an area which is exclusively one- and two-family residential, both categories of land use suffer. The increased traffic from the industrial use makes the area undesirable for residences and deteriorates streets made for fewer and smaller vehicles. The narrow streets and domestic activities of a residential area make it very difficult for delivery trucks and workers to drive to the industrial area.*
>
> *This problem can be overcome by establishing buffer or transition areas between uses which are significantly different.*

Permanent land use compatibility is fundamentally linked to sustainable land use practices. Sustainable land use practices are methods and strategies aimed at utilizing land resources in a way that meets current needs without compromising the ability of

[63] Res. 17-1984, passed 8-14-84. § 154.11 Compatibility of Land Uses.

future generations to meet their own needs (American Planning Association, 2015). These practices focus on balancing environmental, social, and economic considerations to create resilient and thriving communities. Here are some key sustainable land use practices:

1. *Conservation of Natural Resources:*
    - Protecting water sources, forests, wetlands, and other critical ecosystems.
    - Promoting the conservation of soil through erosion control measures and sustainable farming techniques.
2. *Smart Growth and Urban Planning:*
    - Encouraging compact, mixed-use development to reduce urban sprawl.
    - Implementing transit-oriented development (TOD) to promote public transportation and reduce reliance on cars.
    - Preserving open spaces, parks, and greenbelts within urban areas.
3. *Green Building and Infrastructure:*
    - Incorporating energy-efficient and environmentally friendly building materials and practices.
    - Promoting the use of renewable energy sources such as solar, wind, and geothermal.
    - Designing buildings and infrastructure to minimize resource consumption and waste.
4. *Sustainable Agriculture and Forestry:*
    - Practicing crop rotation, agroforestry, and organic farming to enhance soil fertility and biodiversity.
    - Implementing sustainable forest management practices to ensure the long-term health of forest ecosystems.
5. *Integrated Land Use Planning:*
    - Considering the interconnections between different land uses and their cumulative impacts on the environment and communities.
    - Involving stakeholders in the planning process to ensure that diverse perspectives are considered.
6. *Climate Change Adaptation and Mitigation:*
    - Implementing strategies to reduce greenhouse gas emissions, such as promoting public transportation and energy-efficient buildings.
    - Planning for climate resilience by incorporating flood management, green infrastructure, and other adaptive measures.
7. *Protection of Biodiversity:*
    - Establishing protected areas and wildlife corridors to preserve habitats and ecosystems.
    - Encouraging the use of native plants in landscaping and restoration projects.
8. *Efficient Resource Use:*
    - Promoting water conservation through efficient irrigation and rainwater harvesting.
    - Reducing waste through recycling, composting, and waste-to-energy initiatives.

By adopting these sustainable land use practices through Official Plan policy and enforcing them via zoning and municipal bylaws, communities can enhance their resilience, promote environmental stewardship, and ensure a higher quality of life for current and future generations.

Context-Specific Considerations for Incompatible and Sensitive Land Uses

In land use planning, it is crucial to recognize that the impacts of various land uses are not universal but rather context-specific. Incompatible and sensitive land uses must be assessed based on their particular circumstances and the nature of incoming developments. The relationship and interaction between different land uses can significantly influence the environment, human health, safety, and the overall quality of life in a community. Definitions and key factors of incompatible and sensitive land uses highlight the importance of context-specific analysis. By examining the specific impacts of aggregate extraction operations on surrounding areas, the aim is to provide a comprehensive understanding of how these activities can affect various land uses and human activities in a particular community. The discussion also underscores the need for careful planning and implementation of mitigation measures to protect sensitive land uses and ensure sustainable and harmonious land use compatibility.

Through detailed analysis and evidence-based reviews, the nuances of land use compatibility are explored, providing valuable insights for planners, policymakers, and community stakeholders involved in land use decision-making processes.

Incompatible Land Use

- *Definition:* Incompatible land uses are those that, due to their nature and impacts, should not be located near each other because they can cause negative effects on each other and reduce the value of both. For example, placing a heavy industrial facility next to a residential neighborhood is considered incompatible due to the noise, pollution, and traffic generated by the industrial facility (Bedford, Indiana, Code of Ordinances, § 154.11, Res. 17-1984).
- *Key Factors*: The main factors include the type, scale, intensity, and duration (if known) of the land use and the potential for conflicts due to noise, pollution, traffic, and other considerations such as property-value impacts related to use, enjoyment and quality of life.

Sensitive Land Use

1. *Definition*: Sensitive land uses are those that are particularly vulnerable to negative impacts from nearby developments or activities. These uses require a certain level of environmental quality and are protected to ensure their proper functioning and the well-being of their users.
2. *Key Factors*: The main factors include the need for a quiet, clean, and safe environment, and the potential of adverse health, safety, or environmental impacts from nearby activities.

Achieving a high degree of permanent land use compatibility and ensuring appropriate uses is a recognized planning goal.[64] This goal acknowledges the following relationships, objectives and concerns.

1. *Community Engagement*: Engaging with the community, including Indigenous Peoples, through public meetings and workshops is essential for ensuring that a decision on a proposed land use aligns with local needs and values.
2. *Natural Features:* The appropriateness of a proposed land use with respect to natural features.
3. *Cultural and Historical Preservation*: The appropriateness of a proposed land use with respect to preserving cultural and historical sites.
4. *Community Facilities and Services*: The appropriateness of a proposed land use in the context of existing and planned community facilities and services.
5. *Transportation System*: The appropriateness of a proposed land use in the context of existing and planned elements of the transportation system.
6. *Local and Regional Trends*: The appropriateness of a proposed land use in the context of local and regional trends and needs.
7. *Land Use Compatibility*: The overall compatibility of a proposed land use with respect to existing and proposed future land uses.
8. *Negative Externalities*: The containment onsite of negative externalities from a proposed land use to prevent these costs from being imposed, directly or indirectly, on innocent third-party property owners or at the expense of the environment.
9. *Economic Impact*: The economic consequences of a proposed land use on the local economy, employment opportunities and property values.
10. *Health, Safety, and Welfare*: The appropriateness of a proposed land use with respect to concerns over the health, safety, and welfare of existing and future residents.
11. *Sustainability:* The appropriateness of a proposed land use on the long-term environmental, social and economic sustainability of existing communities.

Land Uses and Human Activities Made Incompatible by Aggregate Extraction Operations

Operating a pit or quarry with blasting (detonation of explosives), accompanied by perpetual dewatering below the water table, can sterilize certain legally permissible land uses or render them incompatible or infeasible, resulting in changes in the highest and best use[65] of third-party properties and reductions in market value. This is tantamount to a de facto taking without compensation, where property owners are deprived of the full use and enjoyment of their properties without compensation. These operations can significantly impact sensitive lands, and make human activities unsafe and unhealthy. The "Vision" statement in the PPS (2024) states, in part,

[64] Technical Background Report, Land Use Compatibility. Chapter 6, Town of Union Unified Comprehensive Plan (January 13, 2009). Cover Page TBR Land Use Compatability.pub.

[65] *Highest and best use* is defined as "the reasonably probable use of property that results in the highest value. The four criteria that the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity. *Dictionary of Real Estate Appraisal*, Seventh Edition, © 2922, Appraisal Institute.

> "Ontario's vibrant agricultural sector and sensitive areas will continue to form part of the province's economic prosperity and overall identity. Growth and development will be prioritized within urban and rural settlements that will, in turn, support and protect the long-term viability of *rural areas*, local food production, and the *agri-food network*. In addition, resources, including natural areas, water, aggregates and agricultural lands will be protected. Potential risks to public health or safety or of property damage from natural hazards and human-made hazards,[66] including the risks associated with the impacts of climate change will be mitigated (PPS, 2024, p. 1)."

Consequently, such noxious, toxic, and destructive aggregate extraction operations should be prohibited in proximity to the following areas:

1. *Residential Areas:* Use and enjoyment of residential areas would be adversely impacted or endangered by exposure to constant noise, fugitive dust, toxic fumes, vibrations, or flyrock debris. Vibrations and flyrock debris can damage homes and other structures, cause injury or death at a considerable distance from the blast site, and the constant risk can make living conditions unbearable.
2. *Agricultural Land*: Alteration of soil and water conditions can render the land unsuitable for farming, especially *specialty crops*.[67] Flyrock debris can damage crops, reducing yield and productivity. Farm equipment and infrastructure can be damaged, leading to costly repairs, and farmworkers operating machinery or working in the fields can be injured or killed.
3. *Recreational Areas*: The normal or routine use of parks, sports fields, trails and other recreational spaces would be adversely impacted or endangered by constant noise, fugitive dust, toxic fumes, vibrations, flyrock debris, or visual intrusion.
4. *Wildlife Habitats*: Natural habitats for wildlife would be disrupted, destroyed, or endangered, making the area unsuitable for conservation efforts. Flyrock debris can destroy or alter habitats, injure or kill wildlife, and disrupt local ecosystems.
5. *Commercial and Industrial Zones*: Businesses and home occupations that require a quiet, safe, and stable environment would be adversely affected or endangered by constant noise, fugitive dust, toxic fumes, vibrations, and flyrock debris. Flyrock debris could halt operations temporarily or permanently, damage buildings, equipment, infrastructure, or inventory, and injure, permanently disable, or kill employees and customers.
6. *Educational Institutions*: Schools and other educational facilities would be adversely impacted or endangered by constant noise, fugitive dust, toxic fumes, vibrations, or flyrock debris. Flyrock debris poses serious risks to students and staff. School buildings and grounds can be damaged, and learning can be disrupted.

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[66] Aggregate extraction meets the definition of a man-made (anthropogenic) hazard, as it is entirely a result of human activities and decisions. Aggregate extraction, which includes activities like quarrying and mining for sand, gravel and stone, can create hazards due to its environmental and social impacts, such as physical and structural risks, environmental hazards and community impacts. United Nations Office for Disaster Risk Reduction (UNDRR). (n.d). Hazard. Retrieved from https://www.undrr.org/terminology/hazard.

[67] "*Specialty crops* are predominantly grown such as tender fruits (peached, cherries, plums), grapes, other food crops, vegetable crops, greenhouse crops, and crops from agriculturally developed organic soil…(PPS, 2024, p.53)."

7. *Healthcare Facilities*: Hospitals, clinics and other medical facilities where noise, dust, toxic fumes, vibrations and blasting (detonation of explosives) could interfere with patient care and operations.
8. *Cultural and Heritage Sites*: Historical landmarks and cultural sites and First Nations records that could be damaged or rendered less accessible by nearby aggregate extraction operations, including blasting (detonation of explosives) and perpetual dewatering.
9. *Water Resources*: Bodies of water and the quality and quantity of ground and surface waters and their surrounding ecosystems, which could be impacted by dewatering and contamination from extraction operations.

Recognizing the Impacts of Pits and Quarries

There is growing public awareness of the environmental, legal and social implications of exposure to the adverse effects and dangers of Pits and Quarries, which are documented and widely reported. These detrimental effects encompass toxic fumes, odours, fugitive dust, airblasts, vibrations and potentially deadly flyrock debris – the most extreme effect (Sevelka, 2024). To avoid or prevent these *adverse effects* or reduce (mitigate[68]) them to a *trivial* level (legally, any impact above a "trivial" level is a *Nuisance*) the most effective measure is a safe mandatory separation (distance) from incompatible land uses and sensitive areas. By maintaining a safe distance between conflicting land uses, communities can significantly reduce their exposure to risks associated with aggregate extraction operations and safeguard the well-being and quality of life for those living, working and playing in those communities. This proactive approach ensures that the adverse effects of aggregate extraction are avoided, eliminated or reduced to a "trivial" level, thereby promoting a healthier and more sustainable environment.

Pits and Quarries are unsuitable for locations near legally permissible sensitive land uses or activities. Given that a license for aggregate extraction in Ontario has no expiry date and no restriction on the depth of extraction, it is reasonable to conclude that the negative impacts of Pits and Quarries on neighbouring public and private property are both cumulative and permanent. In the context of land use planning, the quality of aggregate is not considered relevant when assessing the merits of an application for a Pit or Quarry. The focus is instead on how a Pit or Quarry operation will affect the *use* and *enjoyment* of surrounding public and private properties, interfere with the *normal conduct of business*, and impact the *health*, *safety* and *welfare* of the environment and its inhabitants, both human and non-human. Pits and Quarries are also visually jarring, contrasting sharply with the natural landscape and creating an eyesore, with the potential to stigmatize a community.

By highlighting these points, it becomes evident how the presence of Pits and Quarries disrupt both the aesthetic and functional integrity of a community, requiring exceptional

[68] According to the Collins English Dictionary, to minimize an impact means to reduce it to the lowest possible level or prevent it from increasing beyond that level. This involves taking comprehensive measures to ensure that the effects are brought down to a negligible level. MINIMIZE THE IMPACT definition and meaning | Collins English Dictionary. https://www.collinsdictionary.com/dictionary/english/minimize-the-impact?form=MG0AV3.

levels of awareness, consideration, understanding and a broad skillset by planners. Additionally, planners must avoid viewing individual adverse effects in isolation (i.e., silos) and instead consider them collectively, adopting a proactive, community-focused approach to ensure sustainable development. This involves engaging with local residents, understanding their needs and concerns, and integrating comprehensive land use strategies that balance economic development with environmental and social well-being in Official Plans, enacted through zoning and municipal bylaws. By prioritizing the long-term health and safety of the community, municipal planners can eliminate, avoid or mitigate adverse effects of Pits and Quarries to a trivial level and promote a harmonious and sustainable environment.

Context-Specific Land Use Compatibility: Evaluating Impacts and Regulatory Considerations

Land use compatibility is crucial in urban and regional planning, emphasizing the need to consider the context of each incoming use and its potential impacts on surrounding areas. The type, scale, intensity and duration (if known) of an incoming use determine the nature and magnitude of the potential impacts flowing from the incoming use, and how far from the incoming use those impacts will be experienced. Some potential incoming uses, such as aggregate extraction (i.e. Pits and Blasting Quarries), have far-reaching impacts beyond their boundary limits and require greater scrutiny than proposed benign uses, such as home-based yoga studios or artist studios--activities with little or no external impacts.

Aggregate extraction operations are particularly complex due to their potential to cause significant environmental and socio-economic disruptions. These operations alter landscapes, lower property values, and create long-lasting or permanent ecological damage, making it essential for municipalities to carefully and thoroughly evaluate each proposal. A license to permit aggregate extraction in Ontario has no expiry date and no restriction on the depth of extraction, which adds another layer of complexity to planning, as it necessitates long-term considerations for sustainable development and permanent land use compatibility (Sevelka, 2022). Moreover, understanding the adverse effects of an incoming use is a prerequisite to identifying land uses that would be adversely affected both now and in the future. This comprehensive evaluation must consider the cumulative impacts of ongoing and future aggregate extraction operations, supported by current scientific knowledge and evidence-based reviews of proximity adverse effects at other aggregate extraction sites or sites with similar impacts (e.g. landfills).

When a procedure or protocol of a proposed aggregate extraction operation has the potential to cause harm to the public or the environment and lacks scientific consensus, the burden of proof falls on those advocating for the action to demonstrate that it is not harmful. This approach emphasizes caution, pausing, and thorough review before adopting novel innovations or procedures that may prove disastrous, consistent with the precautionary principle. The precautionary principle was discussed in Justice

Campbell's seminal report *Spring of Fear*, 2007,[69] which dealt with the health and safety issues arising out of the SARS crisis in the early 2000s. As Justice Campbell concluded,

> "If the commission has one single take-home message, it is the precautionary principle that safety comes first, that reasonable efforts to reduce risk need not await scientific proof. Ontario needs to enshrine this principle and to enforce it throughout our entire health system."

After-the-fact environmental clean-up or restoration, if possible, can be extremely costly without voluntary acceptance of financial responsibility by the aggregate extraction industry. Most often, claims of environmental damage are rejected outright by the aggregate industry, resulting in costly and time-consuming litigation at taxpayer expense, which the deep-pocketed aggregate industry will drag out as long as possible. As with all litigation, the outcome is never certain even with a standard of proof for civil litigation being 'more probable than not' (Gordner, Cuervo-Lorens and Käärid, 2023). Beyond the financial burden, the local communities often suffer the most from environmental damage (Sevelka, 2023). By meticulously evaluating and managing land uses, municipalities can ensure harmonious development that supports economic growth while safeguarding the well-being of their communities and the environment. Understanding the potential impacts of an incoming use is a prerequisite to identifying land uses that would be adversely affected now and in the future, as detailed below:

- *Context-Specific Evaluation:* Every proposed land use is evaluated based on its unique characteristics, such as type, scale, intensity and duration (if known). The objective is to ensure that the new use aligns with existing and planned or foreseeable land uses, permanently eliminating all adverse effects or reducing them to a "trivial" level.
- *Potential Impacts:* Different land uses have varying levels and degrees of impact. A high-impact use like aggregate extraction produces flyrock debris, fugitive dust, toxic fumes, noise, vibrations and traffic congestion, affecting a wide area and depreciating property values. In contrast, a low-impact use like a home-based yoga studio or artist's studio typically causes little or no external effects or impacts.
- *Cumulative Impacts:* An aggregate extraction operation without an expiry date can permanently degrade the environment, permanently affect the quality of life for nearby residents, and permanently sterilize sensitive land uses from ever being established, a de facto taking without compensation. Cumulative impacts also include the ongoing strain on local infrastructure and services, increased traffic congestion, and the potential for long-term health issues among residents due to persistent exposure to pollutants.
- *Identifying Incompatible or Sensitive Land Uses:* Incompatible or sensitive land uses are determined by the type, scale, intensity and duration (if known) of the incoming use. Quantitative proximity studies related to the incoming use or similar uses (e.g., landfills) can assist in making this determination.
- *Scrutiny and Regulation:* A high-impact use demands greater scrutiny and more stringent regulations. This includes detailed environmental assessments, public consultations, adherence to specific and effective mitigation measures, and

[69] Campbell commission: Spring of Fear, CBC News, January 10, 2007. CBC News in Depth: SARS.

greater onsite setbacks and offsite separation distances to protect nearby residents and ecosystems.

- *Permanent vs. Temporary Uses:* Some land uses, like aggregate extraction are unique in that their permits or licences have no expiry date in Ontario. This permanence complicates municipal planning efforts, as it requires long-term considerations for land use compatibility and sustainable community development for present and future generations.
- *Blasting Quarries:* Blasting quarries involve using explosives to break rock, generating noise, fugitive dust, toxic fumes, vibrations and flyrock debris. Flyrock debris or rock fragments ejected beyond the site pose additional risks to safety and property. Establishing permanent onsite setbacks (extraction limits) and permanent separation distances offsite are essential to avoid,[70] eliminate or reduce the impacts to a "trivial" level.
- *Health, Safety and Welfare*: These are overriding considerations in land use planning and regulatory decisions. Municipalities and regulatory bodies are legally bound to prioritize these factors to ensure that development activities of an incoming use do not adversely impact residents' well-being. This principle is embedded in various planning frameworks and regulations to protect public health and maintain a high quality of life for present and future community members.
- *Balancing Development and Sustainability*: Municipalities strive to balance economic development with environmental sustainability. Ensuring permanent land use compatibility involves protecting sensitive areas, preserving green spaces, and maintaining the character and quality of life for current and future residents.

By carefully evaluating and managing land uses, municipalities can foster harmonious development that supports both economic growth and the well-being of their communities.

Comparative Analysis of Land Use Compatibility across Geographic Locations

Land use compatibility is a critical aspect of urban and regional planning, necessitating a thorough understanding of how different land uses impact each other and the surrounding environment. This analysis aims to explore the various factors influencing land use compatibility across different geographic locations, with a specific focus on proximity studies at other sites similarly impacted. By examining the geographic context, regulatory frameworks, impact assessment methods, and case law, valuable insights can be gained into managing land use compatibility effectively at the local and site levels.

1. *Geographic Context*: Compare land use compatibility across diverse geographic regions, considering factors such as urbanization levels, population density, and natural resource availability.

[70] "Avoid" means to fully avert any potential impact on one or more environmental components resulting from a project or activity." Guidance and Considerations for Mitigation of Impacts on Environmental Values. 2014. Procedures for Mitigating Impacts on Environmental Values.

2. *Regulatory Frameworks*: Examine the regulatory frameworks governing land use in each region. This includes zoning laws, environmental regulations, and land use planning policies.
3. *Impact Assessment*: Analyze the methods used to assess the impacts of land use changes, including environmental, social and economic impacts.
4. *Proximity Studies*: Conduct proximity studies to evaluate the effects of land use changes on surrounding areas, including analyzing the distance between incompatible land uses and the resulting impacts.
5. *Case Studies:* Include case studies of specific regions that have successfully managed land use compatibility, highlighting best practices and lessons learned.
6. *Cumulative Impacts*: Consider the cumulative impacts of multiple land uses over time, especially in regions with ongoing development projects.
7. *Public Consultation*: Evaluate the role of public consultation in the land use planning process, including how different regions engage with stakeholders and incorporate their feedback.
8. *Technological Tools*: Explore the use of technological tools such as Geographic Information Systems (GIS) for land use compatibility analysis (Mansourihani, et al., 2023).
9. *Sustainability*: Assess how land use compatibility contributes to sustainable development goals, including preserving natural resources, promoting economic growth, and ensuring social well-being.
10. *Legal Analysis*: Review relevant legal cases to understand how courts have interpreted land use compatibility issues, identifying legal precedents and principles that guide land use planning and decision-making.
11. *Economic Considerations*: Analyze the economic impacts occasioned by a change in land use, including effects on local economies, property values and employment opportunities.

Additional Considerations

Data Sources: Accurate and reliable data are critical for conducting proximity and impact assessments in land use planning. Utilizing diverse and credible data sources—such as governmental databases, floodplain mapping, academic research, industry reports, and community surveys—ensures a comprehensive understanding of land use compatibility. Geographic Information Systems (GIS) data can offer valuable spatial information (Mansourihanis *et al*., 2025), while science-based environmental impact assessments (EIAs) provide insights into potential ecological effects. Additionally, using remote sensing to map changes in land use over time can alert planners to environmental changes or impacts that have occurred elsewhere due to aggregate extraction (Ataweel, 2022).

Effective Land Use Policies for Permanent Land Use Compatibility

Effective land use planning is crucial for preventing conflicts and ensuring sustainable development within communities. In Ontario, municipalities have the authority under the Planning Act and the Municipal Act to implement various measures that can help achieve permanent land use compatibility. These measures are designed to address the potential impacts of aggregate extraction operations (pits and quarries) on sensitive land

uses and activities. Outlined below are several straightforward yet impactful policies that municipalities can enact to protect the health, safety, and well-being of their residents, as well as the environment. By adopting these policies, communities can avoid, eliminate or minimize to a "trivial" level adverse effects like noise, dust, toxic fumes, vibrations, and flyrock debris, thereby promoting a harmonious coexistence of different land uses. The following measures provide a comprehensive framework for land use planning that balances economic benefits with the need for environmental conservation and social equity.

- *Incompatible and Sensitive Land Uses:* Identifying all potential sensitive land uses and activities within an appropriate radius of the proposed incoming use is a fundamental step. Considering the unique characteristics of an incoming aggregate extraction operation, including its proposed size, scale, intensity and duration (if known) is crucial for a comprehensive assessment.
- *Buffer Zones or Separation Distances:* Creating buffer zones or maintaining separation distances to protect sensitive land uses and activities from impacts like noise, dust, toxic fumes, airblasts, vibrations and flyrock debris is a recognized best practice. A suggested mandatory minimum separation distance of 1,000 metres is appropriate.[71]
- *Setbacks:* Imposing fixed onsite setbacks (excavation limits) along with offsite separation distances helps to effectively contain impacts, A mandatory minimum setback of 500 metres is appropriate.
- *Water Management Plans:* Demanding comprehensive water management plans to handle, store and treat water onsite, and prohibit water from being discharged offsite to prevent potential environmental damage or pollution (Wright, 2024).
- *Detonation of Explosive:* Prohibiting the detonation of explosives within a mandatory minimum distance from sensitive land uses or activities or Settlement Areas addresses public safety concerns. A suggested minimum distance of 1,500 metres is prudent.[72] (Similar to banning fireworks that use low-level explosives, but which are less impactful and dangerous than detonating high-level explosives.)[73]

[71] According to Section 4.38.10 of the Algonquin Highlands, Ontario, Official Plan, a new aggregate quarry shall be located farther than 1,000 metres from a *residential* or *sensitive land*, a boundary of a *Settlement Area* and *Waterfron*t designation. Official Plan | Algonquin Highlands. https://www.algonquinhighlands.ca/municipal-services/planning/official-plan/.

[72] *Tinsley Properties, LLC et al., v. Grundy County, Tennessee*, No. M2022-01562-COA-R3-CV (Tenn. Ct. App. Feb.8, 2024). Tinsley Properties, LLC et al. v. Grundy County, Tennessee. Tennessee Administrative Office of the Courts. Available online at: https://www.tncourts.gov/courts/court-appeals/opinions/2024/02/08/tinsley-properties-llc-et-al-v-grundy-county-tennessee.

[73] The Corporation of the Town of Caledon, By-law No. 2022-022. A by-law to regulate and prohibit the sale and discharge of fireworks, to provide for the issuance of permits for the sale and discharge of fireworks and to repeal By-law 2009-097. THE CORPORATION OF THE TOWN OF CALEDON Low-level explosives fireworks are prohibited (f) within 300 metres of any industrial premises, agricultural premises or place where explosives, gasoline or other highly flammable liquids or gas substances of compounds are manufactured or stored in bulk; and (g) within 300 metres of a hospital, nursing home, home for the aged, church, school, day-care or other similar type of occupancy unless a Discharge Permit and the consent of the owner is obtained.

"In *Federal District Commission v. Franceschini et al.*, (1961),[74] an expropriation case heard by the Exchequer Court of Canada rejected a compensation claim based on a hypothetical blasting quarry operation precluded by City of Ottawa By-law No. 251-50, dated December 18, 1950, which regulated the "storage, handling and use of explosives." Section 16, provides that "no blasting shall be carried out within a distance of 545 feet [166 metres] from any water storage reservoir, pumping station, transformer station or water storage tank" with almost half of the expropriated property within 545 feet. Moreover, Section 5, provides that "no explosive shall be stored within a distance of 1,000 feet [305 metres] from the nearest part of any water storage reservoir, pumping station, transformer station, water storage tank or water main larger than 12 inches in diameter," with most of the expropriated property within this distance. Not an appropriate location for a blasting quarry given the risk to public safety."

- *Vibrations and Nuisances:* Passing by-laws prohibiting adverse effects and contaminants from leaving an aggregate extraction site is essential to protect the health, safety and welfare of the surrounding communities (Ferri and Ng, n.d.).
- *Testing Equipment:* Ensuring all testing equipment (e.g., seismographs, noise meters, anemometers) is contained onsite and that all measurements are confined to the perimeter of the site helps prevent trespassing and nuisances, safeguarding the use and enjoyment of third-party property.
- *Phasing and Sequencing:* Implementing phased and sequenced operations for large-scale aggregate extraction projects, with each phase requiring approval and reevaluation before proceeding to the next, ensures sustainable land use compatibility. This approach, integrated into a comprehensive municipal land use plan, helps minimize environmental and community impacts.
- *Emergency Response Plans:* Require aggregate extraction sites to have emergency response plans in place to address accidents, spills, or other incidents that may impact the surrounding community and environment.
- *Economic Impact Assessments*: Conduct economic impact assessments to understand the potential effects on local economies, property values, and employment. This helps in balancing economic benefits with environmental and social costs.
- *Comprehensive Studies*: Require comprehensive land use compatibility studies to assess the potential impacts on surrounding land uses, including residential, agricultural and recreational uses, and utility infrastructure (e.g., nuclear plants, hydro substations, high voltage power lines, gas lines, water lines, water towers, cell towers, etc.).
- *Meaningful Public Engagement*: Ensure that the community is timely and thoroughly informed and actively involved in the planning process through regular public consultations, workshops and information sessions. This engagement allows residents to voice their concerns, provide valuable insights and input, and actively participate in decision-making. Transparent

[74] *Federal District Commission v. Franceschini et al*., 1961 CanLII 810 (CA EXC), <https://canlii.ca/t/jzqwk>, retrieved on 2024-12-27.

communication, engagement and responsiveness can lead to more equitable and accepted land use outcomes (Windsor Law Centre for Cities, 2023).

Cautionary Comment: In June 2024, MNRF issued policy changes regarding "Applications to amend licences, permits and site plans under the *Aggregate Resources Act*." The policy changes describe requested amendment(s), and provide for a self-serving identification of "any potential impacts" along with a discretionary right that "measures to address impacts should be recommended by the applicant where potential impacts are identified." "Additional information or reports may be requested by the ministry if the information provided does not clearly identify and address potential impacts." "The scope of information that may be requested by the ministry will ultimately depend on the size and complexity of the proposed amendments. (Section 2)."[75] To protect the public against these new potential threats from the aggregate industry to the environment and the health, safety and well-being of the public, there is a reinforced need for municipal by-laws, as permitted under the Ontario Municipal Act, to enhance mandatory minimum onsite setbacks (i.e., permanent exaction limits) beyond provincial limits, and mandatory offsite separation distances from sensitive land uses.

Conclusions

Ontario's provincial policy-led planning system recognizes and addresses the complex inter-relationships among environmental, economic, health and social factors in land use planning, as detailed in the PPS (2024). The land use planning document is to be read in its entirety, and the relevant policies are to be applied to each situation. When more than one policy is relevant, a decision-maker must consider all of the relevant land use policies to understand how they work together.[76] There is no implied priority in the order in which the land use policies appear (PPS, 2024, p. 3).

Achieving permanent land use compatibility is a fundamental goal in urban and regional planning, essential for fostering sustainable and harmonious communities. Through a comprehensive analysis of geographic context, regulatory frameworks, impact assessment methods, proximity studies, and case law, the multifaceted and complex nature of land use compatibility is highlighted. By examining diverse regions and the factors influencing land use decisions, valuable insights are gained into managing land use conflicts effectively at the local and site levels. Preventing land use conflicts eliminates public complaints of nuisance and trespass, costly oversight measures, and expensive and time-consuming lawsuits.

Key considerations, including the need for robust data sources, meaningful public consultation, and the integration of technological tools, have been underscored as critical

[75] Applications to amend licenses, permits, and site plans under the *Aggregate Resources Act*. June 2024. https://www.ontario.ca/files/2024-09/mnr-amendment-policy-june-2024-en-2024-09-12.pdf.

[76] In *2220243 Ontario Inc. v. Halton (Regional Municipality)*, [2015] O.M.B.D. No. 418, the Board stated at para. 41: *The "as is realistically possible" approach means addressing competing interests of many stakeholders, one of which is the aggregate industry. With respect, it would be an over-simplification of the policy and an error of interpretation in my estimation to suggest that "as is realistically possible" only includes the physical existence of the aggregate resource.* https://www.omb.gov.on.ca/e-decisions/pl110857-May-07-2015.pdf?form=MG0AV3.

components of a successful and effective land use planning strategy. Moreover, the emphasis on sustainability, economic impacts, and cumulative effects ensures that planning decisions support long-term community well-being and environmental health. As highlighted in the 'Land Use Planning Tools for Local Adaptation to Climate Change' (Richardson and Otero, 2012), these elements are essential for building resilient and climate-adaptive communities. By adopting informed and context-specific land use policies, municipalities can avoid, eliminate or mitigate adverse effects to a "trivial" level, promote equitable development, and safeguard the health, safety, and welfare of their residents. Municipalities should prioritize community engagement to align planning outcomes with local needs and concerns, enacted through zoning and municipal bylaws. As urbanization continues to transform *peri-urban*, *semi-rural* and *rural* landscapes, the significance of meticulous land use planning cannot be overstated. This paper serves as a call to action for planners, policymakers, and stakeholders to prioritize permanent land use compatibility to create resilient, vibrant, and sustainable communities for future generations.

It is crucial to recognize that in Ontario, aggregate extraction licenses have no expiry dates, as evidenced in large part by the massive number of dormant ("zombie") and unattended pits and quarries that have remained inactive for more than 10 years, posing a major environmental threat. Additionally, there is no restriction on the depth of extraction, and blasters do not have to undergo a criminal background check or hold a license or certificate to demonstrate knowledge of regulatory requirements and competency in handling and detonating explosives, further complicating efforts to manage and mitigate the long-term and often permanent impacts of these operations. Adherence to the precautionary principle is the best approach in these circumstances.

The larger the size, scale, intensity and duration of aggregate extraction operations, the greater their environmental impacts and the broader the loss in value of neighbouring properties. This point is underscored by the Yukon Supreme Court's decision in *McLean Lake Residents' Association v. City of Whitehorse and Yukon Government* (Department of Energy, Mines and Resources), 2007 YKSC 44, which ruled that a 40-year expected lifespan for a quarry was not an interim use under the Environmental Protection Act.[77] Additionally, the disclosure requirements under TRESA, as relating to existing and potential aggregate extraction operations, place sellers of impacted properties in a difficult position of either disclosing material facts that would lower their property values or risk legal action from uninformed buyers having paid more than market value.

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[77] In *McLean Lake Residents' Association v. City of Whitehorse and Yukon Government (Department of Energy, Mines and Resources)*, 2007 YKSC 44, the Supreme Court of the Yukon Territory ruled that a 40-year lifespan for a quarry did not qualify as an interim use. The court considered a 40-year period too lengthy to be regarded as temporary or short-term, which has implications under the Environmental Protection Act. https://www.yukoncourts.ca/sites/default/files/documents/en/mclean_lake_v_city_of_whitehorse_and_ytg_2007yksc44.pdf?form=MG0AV3.

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Authors' Declarations and Essential Ethical Compliances

Author's Contributions (in accordance with ICMJE criteria for authorship)

This article is 100% contributed by the sole author. He conceived and designed the research or analysis, collected the data, contributed to data analysis & interpretation, wrote the article, performed critical revision of the article/paper, edited the article, and supervised and administered the field work.

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Research involving human bodies or organs or tissues (Helsinki Declaration)
The author(s) solemnly declare(s) that this research has not involved any human subject (body or organs) for experimentation. It was not a clinical research. The contexts of human population/participation were only indirectly covered through literature review. Therefore, an Ethical Clearance (from a Committee or Authority) or ethical obligation of Helsinki Declaration does not apply in cases of this study or written work.

Research involving animals (ARRIVE Checklist)
The author(s) solemnly declare(s) that this research has not involved any animal subject (body or organs) for experimentation. The research was not based on laboratory experiment involving any kind animal. The contexts of animals were only indirectly covered through literature review. Therefore, an Ethical Clearance (from a Committee or Authority) or ethical obligation of ARRIVE does not apply in cases of this study or written work.

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The author(s) solemnly declare(s) that this research has not involved the plants for experiment and field studies. Some contexts of plants are also indirectly covered through literature review. Thus, during this research the author(s) obeyed the principles of the Convention on Biological Diversity and the Convention on the Trade in Endangered Species of Wild Fauna and Flora.

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